2001/2002: Report 1

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Managing Interface Fire Risks

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Canadian Cataloguing in Publication Data
British Columbia. Office of the Auditor General.
Managing interface fire risks

(Report ; 2001/2002: 1)

ISBN 0-7726-4556-6

1. Wildfires - British Columbia - Prevention and control - Evaluation. 2. Forest fires - British Columbia - Prevention and control - Evaluation. 3. Dwellings - Fires and fire prevention - British Columbia - Evaluation.

I. Title. II. Series: British Columbia. Office of the Auditor General. Report ; 2001/2002: 1.

SD421.34C3B74 2001 363.37'7'09711 C2001-960134-4

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Sir/Madam:

I have the honour to transmit herewith to the Legislative Assembly of British Columbia my 2001/02 Report 1: Managing Interface Fire Risks.

Wayne Strelioff

Wayne Strelioff, CA
Auditor General

Victoria, British Columbia
June 2001

copy: Mr. E. George MacMinn, Q.C.
Clerk of the Legislative Assembly

table of contents

Auditor General's Comments 1

Highlights

- Audit Purpose and Scope 6
- Overall Conclusion 8
- Key Findings 10
- Summary of Recommendations 16

Detailed Report

- Wildland interface fires in British Columbia: why we should be concerned 23
- Assigning responsibilities for managing interface fire risks 34
- Preventing interface fires 48
- Planning for interface fire response and recovery 63
- Gathering and reporting information 85

Ministries Response 91

Glossary of Terms 95

Appendices

- A Survey response summary 101
- B Office of the Auditor General: Performance Auditing Objectives and Methodology 108

auditor general's comments

British Columbia is vulnerable to a variety of natural hazards including wildfires involving flammable vegetation such as trees, brush and grass. Many wildfires occur in remote areas of the province but many also happen in or near urban areas. Fire experts refer to these wildfires as "interface fires." British Columbia has the highest risk of interface fires in Canada because of its climate and topography. The risks are increasing as a result of two key factors—the continuing growth in the number of people choosing to live in or near the forests and grassland areas and the significant build up of forest fuels resulting from years of successful fire suppression activities. Fire experts fear that, if actions are not taken soon to reduce the risks associated with interface fires, it is only a matter of time before these fires will exceed firefighters' ability to contain them and that this might lead to significant loss of life and property.

Several provincial government agencies have prominent roles related to managing interface fire risks. These include the Provincial Emergency Program, Ministry of Forests Protection Branch, and the Office of the Fire Commissioner. And, local governments also have a significant role. As a result, both levels of government need to work together effectively in order to manage the risks.

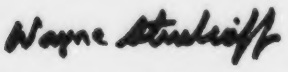
Our audit assessed the degree to which governments in British Columbia—provincial and local—are prepared for major interface fires. We used the emergency management model as our point of reference as it incorporates the key elements of emergency management—prevention, preparedness, response and recovery planning. We also looked at the clarity of the assignment of responsibilities among provincial agencies and local governments, and the gathering and reporting of information needed to manage the risks associated with this hazard.

Our audit points out that provincial and local government agencies in British Columbia have done many good things to help manage interface fire risks but there is still significant room for improvement. The situation does not call for developing new solutions but

rather to find ways and the willingness to apply known solutions to the problems at hand. Our report includes recommendations to help improve the situation.

I would like to thank all those who cooperated with my Office to gather the information for this report—the ministries of Attorney General, Forests, and Municipal Affairs in the provincial government; Chief Administrative Officers, Fire Chiefs, Planners, and Emergency Coordinators associated with local governments from all parts of the province; and the Fire Chiefs' Association of British Columbia, Planners Institute of British Columbia and the Union of British Columbia Municipalities.

As well, I would like to acknowledge the hard work, professionalism and dedication of my staff in the production of this report.



Wayne K. Strelioff, CA
Auditor General

Victoria, British Columbia
June 2001

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managing interface fire risks

highlights

An audit of the management of interface fire risks by governments in British Columbia

In many regions of British Columbia, wildland areas containing flammable vegetation—trees, brush and grasses—exist in close proximity to rural and urban areas containing structures where people live, work and play. The zone where these areas meet is "the interface," and a fire occurring there is called an interface fire.

British Columbia has the highest risk of injury and property losses from interface fires in Canada because the climate and topography of the province make it particularly susceptible to wildfires (fires involving flammable vegetation). As a result, wildfires have been a natural and regular occurrence—and a major hazard—for thousands of years.

Another significant factor in the risk associated with interface fires in the province is that there is a large population living in the interface and the numbers are rising. As a result, there is a greater chance there will be human-caused wildfires and that they will threaten citizens. The presence of people near wildland areas has also led to aggressive fire suppression activities to protect life and limit property damage. This has disrupted the historical occurrence of frequent low-intensity fires that removed flammable undergrowth without significantly damaging larger trees. The accumulation of vegetation combined with a period of dry, hot weather can easily cause an area of the province to have an extreme risk of wildfire.

Firefighting and emergency response agencies have had good success, to date, dealing with interface fires in British Columbia. Since 1994, at least four major interface fire events have threatened thousands of citizens and involved significant costs and losses: the Garnet Fire near Penticton in 1994, the Silver Creek Fire near Salmon Arm in 1998, the Lawless Creek Fire near Tulameen in 1998, and the Greenstone Mountain Fire near Kamloops in 1998. Many other fires have also threatened communities and necessitated evacuations, but the actions of firefighters and emergency responders were successful in minimizing their impacts. However, in those cases, even firefighters admit that their success was largely a result of good fortune rather than good management (e.g., because winds changed to move a fire away from a community), and that it is only a matter of time before a fire will exceed their capability to contain. The result, they fear, if action to reverse

this trend is not taken, will be significant loss of human life and property, as has occurred in other parts of the world such as Australia and the United States—particularly California. The fire experts see the conditions in British Columbia today being similar to those that existed in these jurisdictions more than a decade ago. They also believe that there is a window of opportunity to address the problem before more destructive interface fires occur.

The costs paid by the provincial government as a result of interface fires are limited primarily to the direct costs of fighting the fires. Because private properties are insurable, the province does not pay for those losses (unlike property losses associated with flooding, which are not insurable). Nevertheless, the impact on the province and its citizens goes beyond direct firefighting costs to include costs and losses associated with, for example:

- personal injury and destroyed personal effects;
- business interruption;
- destroyed sites of historical significance;
- destroyed wildlife and habitat; and
- lost tourism opportunities.

Given the significance of interface fires in the province and their potential destructiveness, it is important that the associated risks be adequately managed. This presents a significant challenge because several levels of government are involved and several pieces of legislation govern the management of interface fires.

Audit Purpose and Scope

The purpose of our audit was to assess the degree to which governments in British Columbia are prepared for major interface fires.

The audit focused on the following provincial government entities with responsibilities for managing interface fire risks (either directly or in support of local governments):

- Protection Branch in the Ministry of Forests;
- Office of the Fire Commissioner in the Ministry of Municipal Affairs; and
- Provincial Emergency Program in the Ministry of Attorney General.

The audit also included local governments (cities, districts, regional districts, municipalities, towns and villages) in order to assess the extent to which local and provincial government activities have been effective at managing interface fire risks.

We assessed the degree to which governments are prepared by looking for answers to the following questions:

- Have the responsibilities relating to the management of interface fire risks been clearly assigned through legislation or otherwise?
- Have adequate steps been taken to prevent interface fires and mitigate their effects if they occur?
- Have adequate steps been taken to prepare to respond to and recover from interface fires if they occur?
- Is adequate information being gathered about interface fire risks in order to assess the magnitude of the issue in the province, raise awareness, plan the appropriate provincial actions, and report on the levels of preparedness of provincial communities?

Our audit was carried out between December 1999 and July 2000. Our examination was performed in accordance with assurance standards established by the Canadian Institute of Chartered Accountants, and accordingly included such tests and other procedures we considered necessary in the circumstances. We obtained evidence from three main sources: interviews, surveys and document reviews.

Our provincial government interviews focused on staff of the Ministry of Forests, Office of the Fire Commissioner, and the Provincial Emergency Program in both head office and field locations throughout the province. As well, we interviewed local authority staff such as chief administrative officers, fire chiefs, development/planning directors, and emergency coordinators in areas of the province with significant interface fire risks.

We designed and conducted four surveys targeting local authorities including chief administrative officers, fire chiefs, development/planning directors, and emergency coordinators (Appendix A). The purpose of the surveys was to obtain the recipients' assessments of the interface fire risks their communities face and the adequacy of interface fire risk management in their immediate locations.

During the course of the audit, we also collected and analyzed more than 200 documents containing research results and information about factors related to the management of interface fire risks.

We did not review the adequacy or appropriateness of the methods and approaches used to fight interface fires. (For details about the Office's performance auditing objectives and methodology, see Appendix B.)

Overall Conclusion

We concluded that governments in British Columbia need to do more to be better prepared for major interface fires. A significant problem is that there is a lack of complete and reliable information about the issue—number of fires, locations, and the costs and losses associated with these events. In our opinion, the lack of information hampers efforts by provincial agencies whose role it is to raise the level of awareness of the issue among provincial and local governments. This, in turn, leads to limited attention being given to the issue by both levels of government.

Another important problem is the lack of clarity in the allocation of roles and responsibilities among provincial agencies for managing interface fire risks. Provincial emergency legislation and policies indicate that local governments are responsible for managing risks within their boundaries, while the provincial government is expected to provide material support, advice, expertise or other assistance as requested. The provincial government is also responsible for managing the risks in unorganized areas. These arrangements work reasonably well when it comes to responding to an interface fire, but response is only one element of sound risk management. The remaining elements—prevention, preparedness and recovery—must also be addressed. At present, there is a lack of clarity about which government agency (or agencies) should do the work. The presence of federal and First Nations lands also add to the lack of clarity in roles and responsibilities. Overall, the number of agencies and levels of government involved makes managing interface fire risks a relatively complex task.

Interface fire prevention requires raising awareness among local governments and their residents about the risks of these fires and encouraging them to take actions to mitigate the risks. Provincial agencies, particularly Protection Branch in

the Ministry of Forests, work hard each year to help raise awareness in communities at risk. However, fire and emergency experts say the levels of awareness continue to need improvement. Protection Branch and the Office of the Fire Commissioner in the Ministry of Municipal Affairs have also produced and made available to communities information that can be used to identify and mitigate interface fire risks. But again, fire and emergency experts believe that interface fire prevention work has been insufficient in many communities with high or moderate risks, and that even when measures are put in place to help control the risks, compliance is a problem.

Preparing to respond to interface fires involves taking action ahead of time to ensure that fire and emergency experts, other emergency response agencies and residents will be ready to react effectively when a fire emergency occurs. Many aspects of response planning are done well in the province, and this has helped limit the number of interface fires involving major costs and property damage. For example, the province has highly trained and well-equipped wildland firefighters strategically located around the province and supported by sophisticated systems for their deployment. Many communities also have highly trained and well-equipped structural firefighters. Agreements are in place to coordinate efforts of the two groups so that effective fire response is assured and resources are added when required. Many communities also have highly-trained emergency responders. Despite all these strengths, there are still areas for improvement. A priority is the need to improve the state of local emergency planning. Not only do many jurisdictions lack emergency plans, but even those that exist often do not deal adequately with interface fires and most do not address recovery planning. Some jurisdictions periodically exercise their fire and emergency response personnel and systems to test their ability to respond to a significant interface fire, but more testing is required and more agencies need to be involved.

Local firefighters and emergency responders both see a need to improve their training and equipment to deal with interface fire situations, and both groups believe their communities are inadequately prepared to deal with major evacuations. Continued efforts are needed to find ways to reduce risks in small communities that have no structural fire services or only small volunteer groups.

Key Findings

Lack of a formal definition for the term "interface fire" and fragmented information gathering make it difficult to measure, evaluate and report on the magnitude of the issue with confidence

Local and provincial government representatives define interface fire broadly as a wildfire that occurs in or near an urban area. However, those same individuals do not agree on a formal definition—the kind of definition necessary for making a reliable count of interface fires and for accurately measuring the costs to fight them and the losses they inflict. For example, according to some agency representatives, an interface fire is a wildfire that affects a single structure. Others say that an interface fire must affect more than one structure. Some include fires that merely have the potential to affect a community or structure; others require that more than the mere threat of damage must exist before a wildfire can be classed as an interface fire. In addition, information being gathered about interface fires is fragmented among the Ministry of Forests Protection Branch, the Fire Commissioner's Office and local fire departments and there is no attempt to combine all the sources of information to provide a comprehensive picture of the issue for the entire province.

The lack of agreement on a definition with enough rigour to distinguish interface fires from purely structural or wildland fires, combined with incomplete reporting of interface fires makes it difficult to count the number of such fires in British Columbia and the extent of their threat. And without complete and reliable information, it is difficult to improve general understanding of interface fire risks and to assess the degree to which communities are prepared for this hazard.

The assignment of responsibilities among provincial government agencies involved in managing interface fire risks is unclear and contributes to the limited attention given to this issue in the province

The mandates of provincial government agencies with a role in managing interface fire risks are relatively clear concerning the agencies' responsibilities for responding to an interface fire. However, the mandates are less clear when it comes to describing agency responsibility for other aspects of interface fire risk management—notably, prevention, response preparedness and recovery planning. For example, the Ministry of Forests Protection Branch does significant

work in both organized and unorganized communities of the province to raise awareness of interface fire risks and to improve response capabilities, but its mandate does not clearly require that it do this work. The Branch does it because it thinks it is important and because no other agency focuses on it. Similarly, interface fires also occur on federal lands (e.g. parks) and Aboriginal reserves. Federal-provincial agreements deal with fire response in these areas, but lack clarity when it comes to determining which agency in these locations is responsible for conducting prevention, response preparedness and recovery work.

Overall, the number of agencies and levels of government involved makes managing interface fire risks a complex task. We believe that the lack of clearly assigned responsibilities among provincial agencies for all aspects of interface fire risk management contributes to the limited importance that the provincial government and local governments attach to this hazard in British Columbia communities at risk.

Awareness of interface fire risks is adequate among firefighters and emergency responders, but inadequate among other key local officials

An important aspect of managing interface fire risks is that there be widespread awareness of the hazard and the damage it can inflict upon a community. Such awareness encourages prevention and preparedness activities.

Provincial and local government agencies, particularly those directly involved with firefighting and emergency response, are adequately aware of the risks associated with a major interface fire. There is, however, inadequate awareness at the local level among elected officials, planners, developers and people in other key community positions who have the ability to influence the management of the risks over the long term. As a result, communities at significant risk to this hazard may not be giving interface fires the attention warranted.

The Ministry of Forests Protection Branch has taken a lead role in developing programs that are being used to help raise awareness of interface fire risks in British Columbia communities. The Branch frequently works with local fire services and emergency responders to deliver the programs, and members of the Provincial Emergency Program and the Office of the Fire Commissioner are also sometimes involved. The materials and approaches appear to be appropriate and consistent with those used in other jurisdictions, although no formal mechanisms are in place to determine whether

the programs are the most cost-effective ways to increase awareness and whether they are being delivered to the right people at the right times. Fire experts in British Columbia believe that awareness-raising efforts have not been adequate or effective and that neither level of government—provincial or local—is doing enough to improve the situation.

Efforts are underway to formally assess interface fire risks in some high and moderate risk communities, but more work is needed

An important step in managing interface fire risks is assessing and quantifying the hazards within and around a forested community. Hazard mapping is a tool used to identify fire hazards and help plan appropriate response actions. Hazard maps also provide a visual aid that can be used to raise awareness of risks and encourage mitigation activities. The Ministry of Forests Protection Branch has been mapping areas of the province over the past several years. The primary focus of its work has been in unorganized areas because organized areas are expected to manage fire risks within their boundaries. The Protection Branch has not yet completed mapping of unorganized areas to its desired standards and many organized areas do not have hazard maps of their communities. As a result, some communities lack an important piece of information used to help manage interface fire risks.

Protection Branch is continuing its work, but to what extent local authorities plan to hazard map their jurisdictions is unclear to us. Notwithstanding this lack of formal risk assessment in many areas, most fire experts we contacted were personally aware of the areas in their communities at risk of interface fire and many of the specific hazards.

Local governments have made only limited use of methods available to reduce the risk of interface fire even in high and moderate risk areas

Several sources of standards are available to show communities cost-effective ways of reducing interface fire risks through means such as creating defensible space between structures and flammable vegetation, and using fire-resistant construction materials. One source of standards is the *Beware and Prepare Community Planner* prepared by the Ministry of Forests Protection Branch and the Fire Commissioner's Office in 1994. However, there is no legal requirement for communities to use the standards. According to fire and

emergency response experts, failure by communities to do so is widespread—even in many high and moderate interface fire risk areas. Some communities have introduced controls to reduce fire risks, but compliance is often poor because of lack of enforcement. As a result, measures known to be effective at limiting the likelihood of a wildfire spreading into a community and reducing the impact on life and property are not being used to an adequate extent by communities at significant risk to interface fire.

Provincial and local agencies have made reasonable arrangements to respond to interface fires but some areas lack structural fire protection and some are hesitant to have their fire departments involved in wildland firefighting

Provincial agencies have taken several steps to prepare to respond to major interface fires. For example, the Ministry of Forests Protection Branch has highly trained staff and strategically located resources that it reassesses as required to enhance its ability to respond quickly. The Provincial Emergency Program has been working on communications and "chain of command" initiatives with other provincial and local government agencies to help ensure a safe and efficient response. And, the Office of the Fire Commissioner has mechanisms in place to call upon fire departments province-wide to provide additional firefighters and equipment when necessary.

Provincial and local firefighting agencies have also established specific working arrangements to coordinate their fire suppression activities and, when interface fires exceed both agencies' capacities, they have means of obtaining additional resources in a timely manner. For the most part, these arrangements appear to work well, but a few aspects still need improvement. For example, local firefighters see a need to improve their access to both the training and equipment required to fight wildfires. And significant parts of the province are without fire departments because they have chosen not to establish them and there is no legal requirement for them to do so. Also, some areas are reluctant to have their fire departments involved in fighting wildfires because of both concerns about their liability and the added cost of equipping and training their firefighters to manage such fires safely and effectively.

Many communities in high and moderate interface fire risk areas lack adequate emergency plans

Local emergency planning is another important aspect of an effective response to an interface fire, particularly to deal with issues other than direct firefighting. Although provincial emergency legislation requires local authorities to have emergency plans and the ability to implement them, no provincial agency has legislative authority to see that such planning takes place. Fire and emergency response experts indicate that, in many organized areas of the province, the plans either do not adequately address all emergency planning related to interface fires or do not exist at all. Other communities in unorganized areas are encouraged but not legally required to have emergency plans and in many instances none exist. As a result, some communities with significant interface fire risks may not be ready to respond to a fire adequately, thereby increasing the possibility of significant impacts on the community.

Provincial agencies recognize the deficiencies in community emergency response planning and have recently been making efforts towards improvement. The Provincial Emergency Program has started a process of formally assessing the preparedness status of communities. The process is ongoing and is expected to take a number of years to complete. Some communities recognize their emergency planning is deficient and are working to improve the situation with the resources available. As well, some of the highest risk areas of the province have established interagency committees that provide a forum to bring all involved agencies together to address the issues associated with different emergencies, including interface fires. These committees are seen as having been very helpful in raising awareness and preparing their communities for an interface fire. The main difficulties faced by these groups include securing funding and maintaining the support of the employers who absorb the cost of their employees participating on the committees.

Evacuation planning needs attention

When a major interface fire threatens a community, it may be necessary to evacuate the residents for both safety reasons and to improve the effectiveness of response efforts. Evacuation has been necessary during several interface fires in the province. The provincial government has developed and issued guidance related to evacuations, but we found a

measure of confusion about this matter among local officials. Many emergency responders see their communities as being somewhat prepared for an evacuation during an interface fire, but a significant number think that their communities are very little or not at all prepared. The issues needing attention include: reiterating who is responsible for ordering evacuations during interface fires; designating which agents should implement an evacuation order; and identifying ways of involving First Nations communities in evacuation planning.

More testing of the ability to respond to major interface fires is needed

During a major interface fire, many provincial and local agencies will be called upon to work together and this will require a high degree of coordination and cooperation. It is therefore important that a community's emergency planning be tested periodically to ensure that the agencies are able to work together efficiently and effectively in order to minimize the fire's impacts.

We found that testing of emergency plans is deficient in many communities. Some fire experts and emergency responders in high or moderate risk areas have taken part in interface fire exercises, but many have not. All organizations that will be called upon in an interface fire emergency need to be more involved with the exercises.

Few communities have considered recovery issues or prepared recovery plans

Recovery planning is another essential step in managing interface fire risks. Well designed recovery plans will help communities affected by a major interface fire return to normalcy following the event and also help to reduce the associated costs and losses. However, despite being required under emergency planning legislation to do so, few communities in British Columbia have considered recovery issues or prepared recovery plans to deal with the aftermath of a major interface fire. Most local governments have neither considered community redevelopment following an interface fire nor prepared plans to guide the recovery process.

summary of recommendations

Over the course of the audit, we gathered extensive information and numerous suggestions from fire and emergency management experts and community leaders. As a result, we are providing an unusually large number of recommendations at a fairly specific level of detail. We believe that being comprehensive and specific in our recommendations will help the responsible agencies deal more effectively with the issues raised in our report.

When making recommendations, we have tried to ensure that they will lead to cost-effective solutions, though this was difficult to do because of the lack of complete and reliable information about the magnitude of the interface fire issue in the province and the associated costs and losses (dealt with in the final section of this report). The number of jurisdictions involved—provincial and local governments, federal government, and, in future, Aboriginal governments —also made the task a challenge. Nevertheless, we believe that support for our recommendations can be drawn from the following underlying assumptions:

- Interface fires pose a threat to human life and property and thereby warrant more consideration than they are now receiving in British Columbia.
- Fire and emergency response experts recognize the need for improvement.
- Preventing a problem generally costs less than dealing with it once it arises.

General

- ***The provincial government should establish an Interface Fire Committee under the provisions of the Emergency Program Act to develop strategies and action plans to improve the management of interface fire risks in the province. The committee should be adequately funded and consist of representatives from the Provincial Emergency Program, the Ministry of Forests, and the Office of the Fire Commissioner. The Provincial Emergency Program—the provincial government's emergency coordinating agency and leader in emergency management—should chair the committee (page 47).***

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Assigning responsibilities

- ***The Interface Fire Committee should clarify roles and responsibilities related to managing interface fire risks (page 47).***
- ***The Ministry of Forests should formalize in legislation its response priorities relating to the protection of human life, property and natural resources (page 47).***

Raising awareness of the risks

- ***The Interface Fire Committee should work to raise awareness of interface fire risks in the province, with emphasis in high and moderate risk locations (page 52).***
- ***The Ministry of Forests should continue to have a significant role in developing and delivering programs to raise community awareness about interface fire risks, and should formalize its plans for doing this work (page 53).***
- ***The Provincial Emergency Program should encourage emergency program coordinators to discuss interface fire risks with local emergency planning committees and to seek the involvement of the committees in raising public awareness about the risks (page 53).***

Assessing the risks

- ***The Interface Fire Committee should encourage organized areas of the province to assess interface fire risks in their communities (page 55).***
- ***The Ministry of Forests should complete hazard mapping of unorganized areas of the province over a reasonable time period, with emphasis on high and moderate risk areas (page 55).***
- ***The Provincial Emergency Program should complete the development of a BC Hazard Risk Vulnerability Assessment model and encourage its use at the local level to assess interface fire risks (page 55).***

Mitigating the risks

- ***The Interface Fire Committee should encourage high and moderate risk communities to take practical steps to mitigate interface fire risks (page 61).***

Establishing working relationships among response agencies

- ***The Ministry of Forests should:***
  - ***Work with local fire departments to address the concerns they have with the Ministry of Forests Operating Guidelines (page 67).***
  - ***Work with local fire departments and emergency response staffs in high and moderate interface fire risk areas to improve the application of unified command (page 67).***
- ***The Office of the Fire Commissioner should:***
  - ***Work with local fire departments to identify practical solutions to the current impediments to fire department response outside prescribed boundaries (page 67).***
  - ***Work with communities to identify practical ways to improve public safety in populated areas of the province that lack fire department services (page 67).***

Accessing additional firefighting and emergency response resources

- ***The Office of the Fire Commissioner should identify the impediments to mutual aid agreements in some fire departments in the province and recommend practical solutions (page 70).***

Planning community emergency response

- ***The Provincial Emergency Program should:***
  - ***Encourage all areas of the province with high or moderate interface fire risks to put plans in place to deal with such emergencies, and to develop the ability to enact the plans when needed (page 73).***
  - ***Review community emergency plans periodically, giving specific attention to interface fire planning (page 73).***
  - ***Finalize development of a formal process for assessing the preparedness level of local authorities and assess each community's level of preparedness on a regular basis (page 73).***
  - ***Develop a detailed implementation plan to provide support at the community level where assessments reveal emergency preparedness deficiencies (page 73).***

Training firefighters and other emergency responders

- ***The Interface Fire Committee should work with communities to improve training of local firefighters and other emergency responders, with emphasis in high and moderate risk locations (page 75).***
- ***The Provincial Emergency Program should:***
  - ***Finalize the training aspects of the British Columbia Emergency Response Management System as quickly as possible and communicate the standard to all local authorities and regional districts (page 75).***
  - ***Devise practical ways to speed the delivery of Emergency Response Management System training to fire departments and local emergency response staffs (page 75).***

Equipping firefighters and other emergency responders

- ***The Interface Fire Committee should identify local fire departments in high and moderate risk locations that lack suitable firefighting and communications equipment, and work with the communities to resolve the deficiencies (page 77).***
- ***The Provincial Emergency Program should encourage local fire and emergency response agencies to test radio communications annually and to acquire access to key frequencies (page 77).***

Planning to evacuate communities

- ***The Provincial Emergency Program should:***
  - ***Develop clear guidelines on evacuation planning and make them available to community officials (page 80).***
  - ***Include an assessment of evacuation planning as part of the proposed overall assessment of the preparedness level of each local authority (page 80).***
  - ***Offer training courses on evacuation planning (page 80).***
  - ***Develop a strategy for improving the provincial capability to provide emergency warnings and alerts, including conducting a review of current provincial capabilities in this regard and researching best practices (page 80).***

Testing the ability to respond to major interface fires

- ***The Provincial Emergency Program should:***
  - ***Develop a program to guide local fire departments and emergency responders in developing realistic scenarios for interface fire exercises (page 83).***
  - ***Encourage provincial communities to conduct interface fire exercises (page 83).***
  - ***Encourage its own representatives, key provincial response agencies and other affected provincial and local agencies to participate, whenever possible, in interface fire exercises conducted by communities (page 83).***
  - ***Actively support local communities in the design, conduct and evaluation interface fire exercises (page 83).***
  - ***Maintain a database of lessons learned and best practices (page 83).***
  - ***Develop an annual exercise schedule and encourage communities to follow it (page 83).***

Recovering from major interface fires

- ***The Provincial Emergency Program should:***
  - ***Develop guidelines and examples of recovery planning and make this material available to provincial communities (page 84).***
  - ***Include an assessment of recovery planning as part of the proposed overall assessment of the preparedness level of each local authority (page 84).***

Gathering and reporting information

- ***The Interface Fire Committee should gather complete and reliable information about the nature and extent of the interface fire issue in the province and use the information to report on the management of the risks in communities with high or moderate risk associated with this hazard (page 89).***

detailed report

wildland interface fires in British Columbia: why we should be concerned

What is an "interface fire"?

British Columbia is primarily a forested province, and wildfires (fires involving flammable vegetation such as trees, brush and grasses) have been a natural and regular occurrence —and a major hazard—for thousands of years. Many wildfires occur in remote parts of the province, but some occur in areas called the " interface." The wildland-urban interface is any area where structures—residential, industrial, recreational or agricultural—are located adjacent to or among combustible wildland fuels (Exhibit 1).

There are many different types of wildland-urban interface areas in the province, including:

- large cities containing forest or grassland areas;
- structures (e.g., homes) situated in lightly populated agricultural areas that may also contain forests or range lands;
- low-density housing communities or subdivisions located next to or in the forest;
- cottages, cabins, and recreational and industrial facilities located in the forest; and
- small to medium-sized communities surrounded by vast expanses of forest.

Fire experts call fires occurring in these areas wildland-urban interface fires or simply "interface fires." Although wildfires have threatened the safety of people and structures in all of these interface area types, incidents have been most common in the latter three.

While many of us may not be familiar with the term "interface fire," we have likely seen news reports showing graphic pictures of homes and businesses being destroyed by fire in the subdivisions of southern California. For example:

- In 1991, the Oakland/Berkley Hills fire killed 25 people, injured 150 others, burned nearly 2,500 homes and 437 apartments, and caused an estimated $1.5 billion in damage.

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- In 1993, the Laguna Beach fire destroyed 366 homes and businesses.
- In 1999, the Jones fire near Redding destroyed 428 structures.

The problem, however, is not unique to southern California. Many states in the U.S. have significant interface fire problems. A recent fire took place in Los Alamos, New Mexico, destroying 235 structures and damaging the Los Alamos National Laboratory.

Interface fire has plagued countries in other parts of the world as well, such as Australia and South Africa (where the insurance industry expects the equivalent of more than $750 million in damage claims from fires in 2000).

Exhibit 1

Wildland-urban interface areas

The term wildland-urban interface describes any area where combustible wildland fuels are found adjacent to homes and other buildings. This may occur where development and wildland fuels (vegetation) meet at a well-defined boundary,[1] or where development and wildland fuels intermingle with no clearly defined boundary.[2]

1 This interface area is the first wave of buildings adjacent to dense wildland vegetation.

2 These interface areas show as individual homes or pockets of buildings surrounded by wildland fuels.

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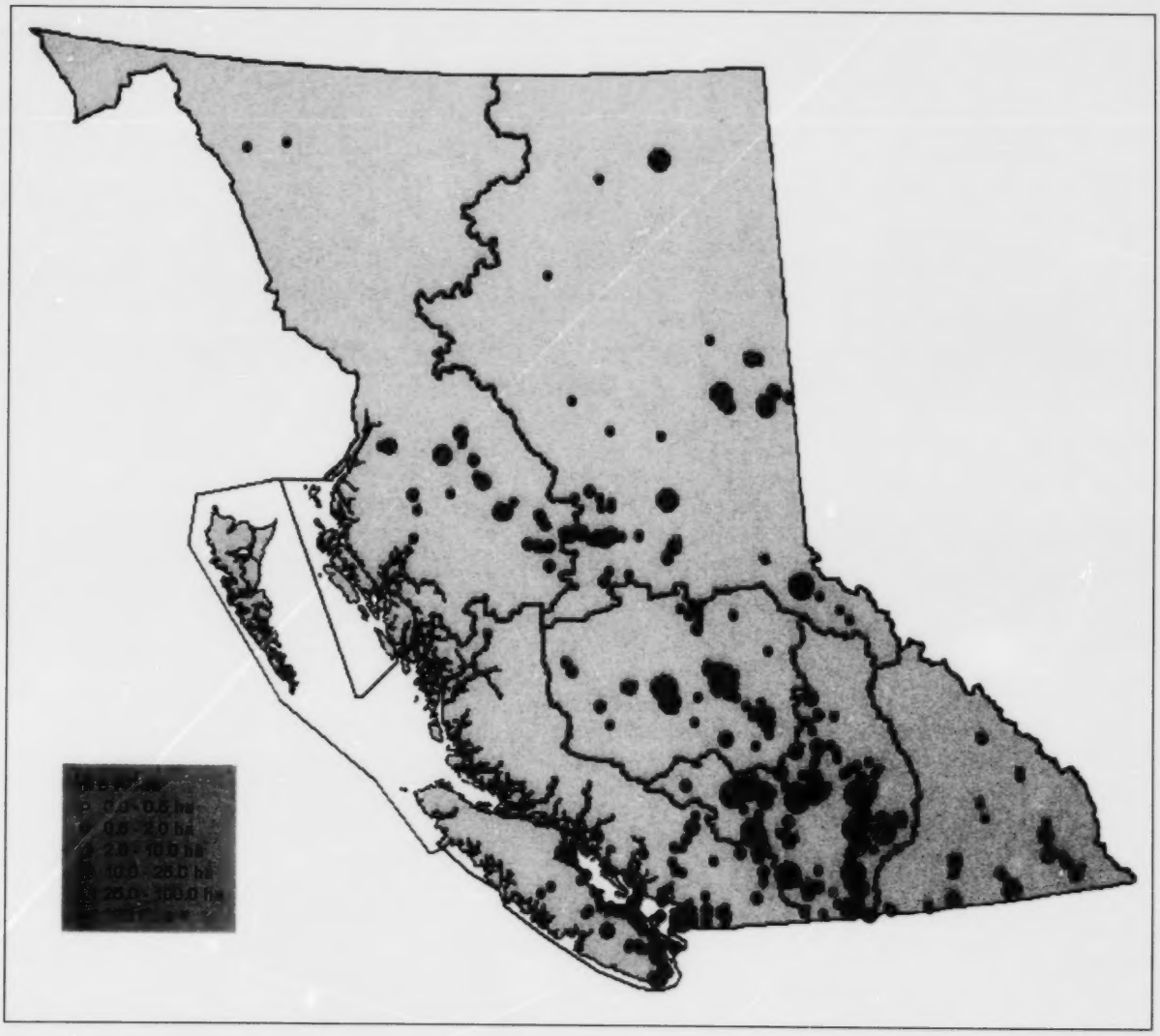
Interface fire experience in British Columbia

Many interface fires occur in British Columbia each year, particularly in the higher populated areas (Exhibit 2). Almost half of the provincial areas with either high or moderate interface fire risks have experienced a significant interface fire within the last 10 years. Fortunately, the actions of fire agencies have generally been successful in minimizing interface fire impacts.

Exhibit 2

Map identifying interface fire locations, 1973 to 1999



Source: B.C. Ministry of Forests

Exhibit 3

Interface fires as a percentage of all wildfires, 1994/95 to 1998/99

	1994/95	1995/96	1996/97	1997/98	1998/99
Wildfires	1,474	1,346	1,161	2,662	1,214
Interface fires	9	172	78	162	65
Interface fires as a percentage of all wildfires	1%	13%	7%	6%	5%

Source: B.C. Ministry of Forests

The Ministry of Forests tracks the number of interface fires from year to year and the percentage those fires represent of the total number of forest fires (Exhibit 3).

Why are British Columbia residents at significant risk?

Two main factors are contributing to the growth in the interface fire problem in our province.

First, years of successful fire suppression by the Ministry of Forests has allowed tree stand density to increase and vegetation to accumulate, increasing the availability of fuels for future fires. Insect and disease infestations also add to the increasing fuel problem.

Second, the number of people choosing to live in the more rural areas of the province (attracted by the natural environment and lower property costs) is continuing to rise. More people living near our forests means a greater number of human-caused fires. It also means greater chance of wildfire affecting people. Migration to the countryside is a significant phenomenon on Vancouver Island and the Sunshine Coast and in the Fraser Valley, Cariboo, Prince George, Kootenays and Okanagan-Shuswap regions.

The Ministry of Forests estimates that several hundred thousand people live in interface zones in the province, and that there are thousands of private and business properties in these areas. The combined value of the properties, improvements and nearby timber easily amounts to several billion dollars.

By moving into and near the forest, we have disrupted the historical occurrence of frequent low-intensity fires that removed flammable undergrowth without significantly damaging larger trees. Because this normal cycle has been disrupted through fire suppression activities to protect life

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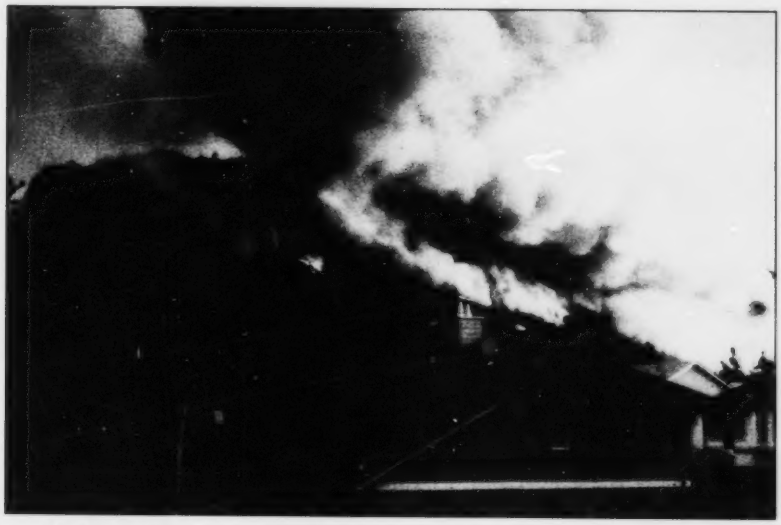


Courtesy: B.C. Ministry of Forests

An interface fire threatens a community

and property, vegetation is accumulating. This situation, combined with two to three weeks of hot, dry and windy weather, can elevate even a rain forest into the "extreme risk of wildfire" category.

Fire experts say that people even in somewhat isolated locations tend to expect the same level of fire protection service as they received in urban settings. And although many have received information about the risks and solutions, they seem to disregard it—a result, perhaps, of seeing past wildfires successfully contained, and of thinking "it won't happen to me."

The reality is that fighting a wildfire in the interface, where the people and structures complicate the options available to firefighters, is risky business. If measures can be taken to prevent the occurrence of a fire or at least reduce its intensity, those preventative actions are far more cost-effective than fighting fires and dealing with the destruction afterward. However, the means of reducing fire risk are not always readily acceptable to residents and their local governments. When controlled burning is suggested (to reduce the density of fuel), concern over smoke is raised. When tree and vegetation removal is proposed (to provide a fire break), concern about aesthetics around individual residences or within the community is voiced. Residents question the need for local bylaws and restrictive covenants that require the use of non-flammable building materials or dictate the type of vegetation that can be planted on private property. Who will pay for any of this preventative work can also be difficult to resolve.

Legal Authorities and Key Players

The wildfire management community in the province includes representation from both provincial and local governments. The legislative framework that governs their approach to managing the risk of interface fire in British Columbia is made up of the following acts, regulations and bylaws:

- the Ministry of Forests Act
- the Forest Practices Code of British Columbia Act and regulations
- the Fire Services Act
- the Emergency Program Act
- the Emergency Program Management Regulation
- the Local Government Act
- the Local Authority Emergency Management Regulation
- municipal/regional district bylaws

Within the provincial government, three key agencies help to manage the risk of interface fire: Protection Branch (in the Ministry of Forests), the Office of the Fire Commissioner (in the Ministry of Municipal Affairs) and the Provincial Emergency Program (in the Ministry of Attorney General).

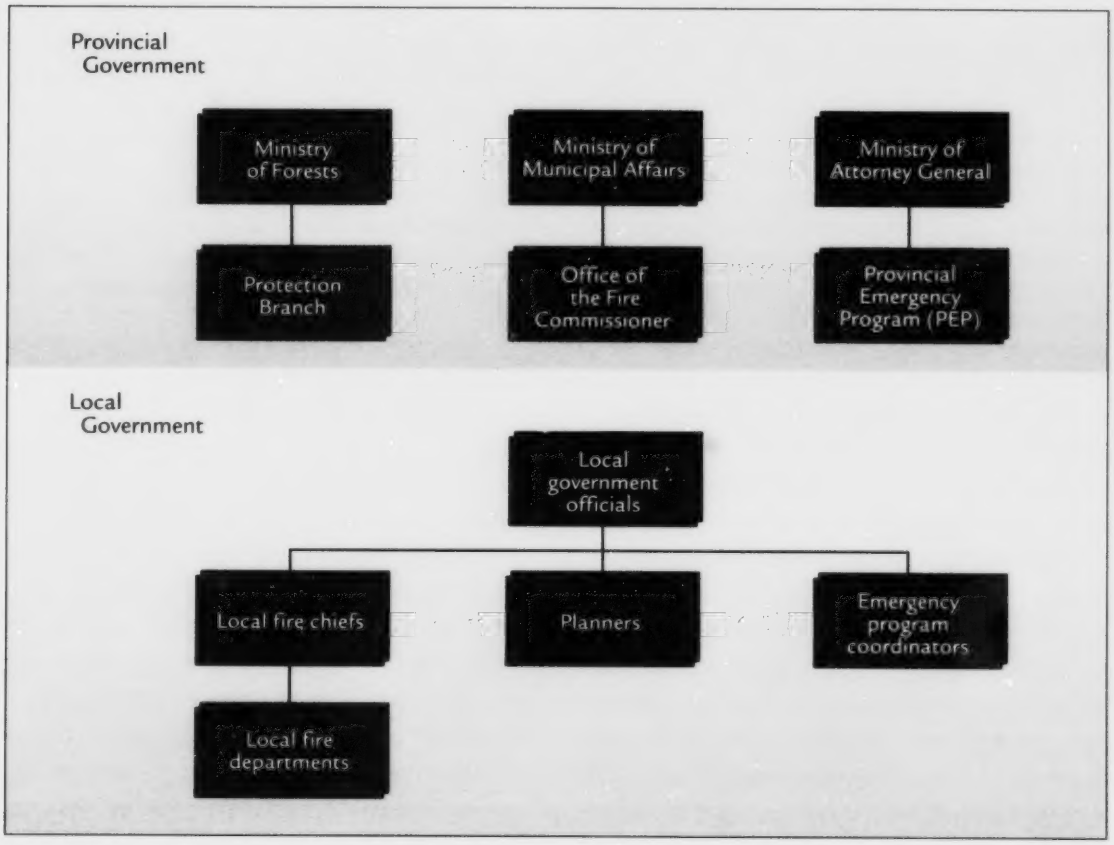
At the local government level, fire departments, emergency program coordinators, development/planning directors and local government officials may play a significant role in capacities that vary by community (Exhibit 4).

Through the Ministry of Forests Act and the Forest Practices Code of British Columbia Act, the ministry is given the authority to extinguish or control fires that threaten the forest resource. Local fire departments are the first responders to all fires within their boundaries. They may call on the Ministry of Forests Protection Branch for assistance if a fire grows beyond their capability. In unorganized areas of the province, where there is no local fire department, the Ministry of Forests takes responsibility for responding to wildfires. However, the ministry does not have the capability (or the mandate) to put out structural fires in any part of the province.

Both the Ministry of Forests and local fire departments may play a role in prevention, taking actions aimed at reducing the likelihood of a fire or reducing the spread of fire and potential loss.

Exhibit 4

Government agencies involved with managing interface fire risks in British Columbia



The Office of the Fire Commissioner is concerned with fire prevention within communities, including investigating conditions under which fires are likely to occur, studying methods of fire prevention, and giving advice and recommendations to local governments. It also consults with and gives advice to fire departments on minimum standards for selecting and training firefighters.

The Provincial Emergency Program is mandated to prepare and maintain a hazard, risk and vulnerability study that identifies potential emergencies and disasters—including interface fires—that could affect all or any part of the province. It is also responsible for making recommendations on emergency prevention, preparedness, response and recovery strategies; creating and maintaining an emergency

management program; and assisting in the coordination of the provincial government's response to emergencies and disasters. At the local government level, Provincial Emergency Program personnel assist in developing local emergency management organizations and emergency programs designed and implemented by emergency program coordinators.

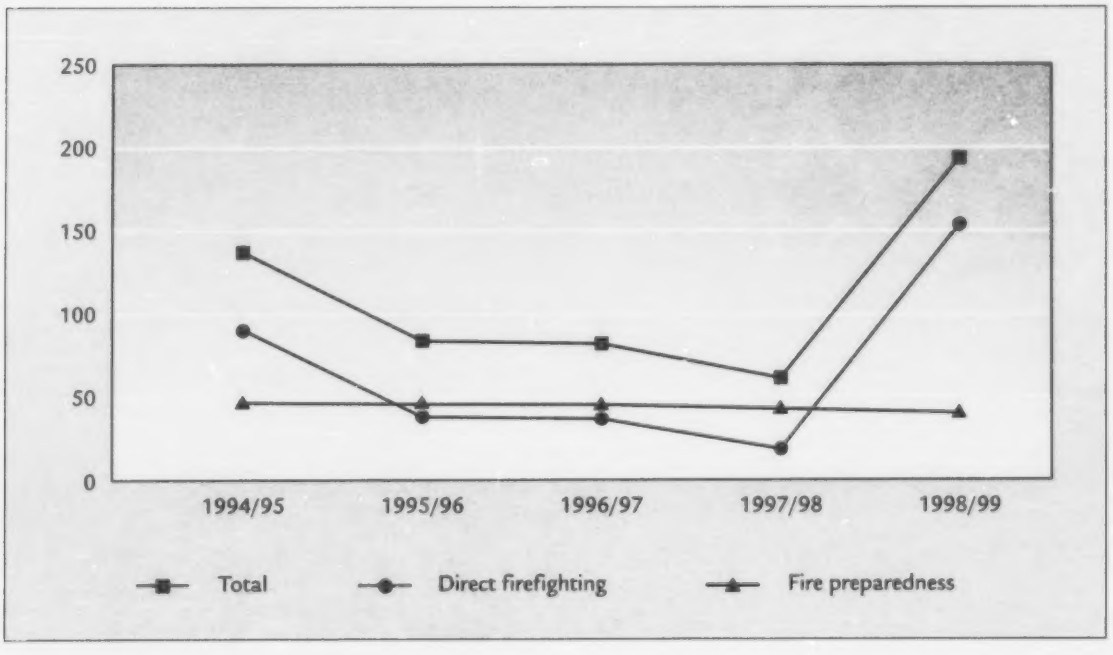
The cost of preparing for and fighting interface fires in British Columbia

The Ministry of Forests Protection Branch is charged with protecting the Crown forest from wildfire. This involves both preparing to respond to wildfires (e.g., through firefighter training and equipment acquisitions) and direct firefighting. The Branch budgets about $75 million annually for both types of activities, but actual firefighting costs (Exhibit 5) depend on the number of fires and their complexities.

The Branch does not routinely separate costs associated with preparing for and suppressing interface fires, so this information is not readily available. Some interface fires, however, are of such a magnitude and consume such a large

Exhibit 5

Ministry of Forests fire protection costs, 1994/95 to 1998/99 ($ millions)



Source: B.C. Ministry of Forests

percentage of the annual direct firefighting costs that the Branch has identified them separately. For example, three interface fires accounted for less than 0.5% of all wildfires during 1998, but 20% of direct firefighting costs. Although many interface fires occurred over the past decade, causing considerable disruption to the affected communities, some of the most significant fires in recent history include the following:

1994

- The Garnet fire near Penticton destroyed 18 homes and many other structures, caused the evacuation of more than 3,500 people, damaged more than 5,500 hectares and cost the provincial government more than $5 million to fight.

1998

- The Silver Creek fire near Salmon Arm destroyed 40 buildings, caused the evacuation of about 7,000 people, damaged over 6,000 hectares and cost the provincial government more than $15 million to fight.
- The Lawless fire near Tulameen cost the provincial government more than $10 million to fight.
- The Greenstone Mountain fire near Kamloops cost the provincial government more than $5 million to fight.

1999/2000

- Although no major interface fires with injuries or significant structural damage occurred, six fires triggered residential evacuations.

Neither of the two other key provincial agencies involved with interface fire management—the Office of the Fire Commissioner and the Provincial Emergency Program—keep track of what they spend specifically on interface fire issues. Local fire departments also spend significant amounts on these fires, but this information is not collected and summarized at the provincial level. Exhibit 6 shows the budgets and staff size of the Ministry of Forests Protection Branch, the Office of the Fire Commissioner and the Provincial Emergency Program.

Notwithstanding their significance, the amounts spent by the three key provincial agencies noted above represents only part of the full range of costs and losses experienced when a fire occurs. The list in Exhibit 7 catalogues other possible costs and losses by entity.

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Our expectations for what governments in British Columbia should be doing to manage the risk of interface fires in the province

British Columbia has significant risks associated with interface fires. Adequate measures should therefore be taken to manage those risks in order to protect the public from losses and to ensure that taxpayers are getting good value from fire protection and emergency response programs.

In this audit, we set out to assess whether interface fire risks are being adequately managed in British Columbia. Specifically, we assessed whether governments in the province had:

- clearly assigned responsibilities for managing interface fire risks;
- established and implemented adequate programs to help prevent interface fires;
- established and implemented adequate programs to plan for response to and recovery from interface fires; and
- obtained the information they need to meet their responsibilities and report comprehensively on the magnitude of the issue and the associated costs and losses.

Exhibit 6

Budgeted costs and staff of the three main provincial emergency preparedness and response agencies, 2000/2001

Programs	Agency		
	Protection Branch	Office of the Fire Commissioner	Provincial Emergency Program
■ Direct fire fighting	$30,302,000		
■ Fire preparedness	$46,506,000		
■ Fire Commissioner operations		$1,926,000	
■ Provincial Emergency Program operations			$ 3,195,000
■ Cost of emergencies			$12,138,000
■ Staff	232	27	50

Source: B.C. Ministry of Forests, B.C. Ministry of Municipal Affairs and the B.C. Provincial Emergency Program

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Exhibit 7

Types of costs and losses incurred as a result of interface fires

General Public
- Lost/damaged buildings/structures
- Evacuation costs
- Legal costs
- Work days lost
- Medical costs
- Lost/damaged other personal property
- Personal injury/fatalities
- Lost property value
- Inconvenience
- Vehicles damaged

Business
- Lost/damaged businesses/structures
- Legal costs
- Lost business opportunities
- Lost/damaged other property
- Personnel time lost during response

BC Transportation and Highways
- Personnel costs
- Road repair

Local Fire Department
- Goods/services expended during response
- Investigation time/expenses
- Legal costs
- Response personnel
- Response vehicles

Local Emergency Program
- Goods/services expended during response
- Response personnel
- Recovery personnel

Local Police/RCMP
- Investigation time/expenses
- Response personnel
- Response vehicles

BC Environment, Lands & Parks
- Destroyed habitat
- Destroyed wildlife
- Lost park revenues

BC Forest Service
- Aircraft services
- Lost Crown timber
- Goods/services expended during response
- Investigation time/expenses
- Legal costs
- Support contracts
- Response personnel
- Response vehicles

BC Office of the Fire Commissioner
- Investigation time/expenses
- Response personnel

BC Provincial Emergency Program
- Goods/services expended during response
- Investigation time/expenses
- Response personnel

Source: InMotte & Associates

assigning responsibilities for managing interface fire risks

Wildland-urban interface fires are complex events that involve several different provincial and local government agencies working cooperatively to:

- prevent or mitigate the effects of these fires;
- ensure that individuals and agencies are prepared to react effectively if the fires occur;
- ensure appropriate response actions are taken to combat the fires if they occur; and
- assist recovery by helping to restore the environment and communities to their pre-fire condition.

Because many government agencies are involved in interface fire management, each one's role must be clear. Only in this way can a safe, appropriate, cost-effective and coordinated approach be assured. We expected to find interface fire responsibilities clearly assigned to the appropriate government agencies, through legislation or other means, and we expected the assigned responsibilities to cover the generally accepted components of emergency management: prevention, preparedness, response and recovery.

Conclusion

The Ministry of Forests, the Office of the Fire Commissioner, the Provincial Emergency Program and local governments all have legislated roles related to the management of interface fire risks. The mandates and agency relationships are relatively clear and work well when it comes to responding to an interface fire. They are less clear, however, concerning other phases of interface fire risk management—prevention, preparedness and recovery, with the result that these aspects are not working as effectively as fire and emergency experts in the province feel is necessary. This ambiguity may also be contributing to the lack of a provincial focus on interface fire as a separate emergency planning issue, as exists for other major hazards such as flooding and earthquakes.

Findings

British Columbia is a beautiful place to live, but its climate and rugged topography make it vulnerable to a variety of natural hazards, including fire. Governments in British Columbia recognize this and understand they have a fundamental obligation to provide for the safety and security of their citizens and the environment in which they live. To fulfill their obligations, governments at both the provincial and local levels must therefore be committed to responding to emergencies wherever they may occur within the province, and must improve their emergency management capabilities constantly to ensure efficient and effective response.

We believe that a clear definition and assignment of responsibilities is a critical first step in helping governments meet their responsibilities, and that legislation is the primary means governments use to define and assign such responsibilities. We reviewed the legislation relating to the key government agencies with a role in managing interface fire risks to see whether their responsibilities had been clearly defined and assigned, and how the legislated requirements compared to their current activities. In carrying out our analysis, we used the emergency management model, which includes the following components:

- **Prevention activities** designed to prevent or mitigate the effects of emergencies. These include measures such as building codes, building use regulations, zoning and land use management, public education, legislation, and tax and insurance incentives and disincentives.
- **Preparedness activities** designed to ensure that individuals and agencies will be ready to react effectively once emergencies have occurred. These include measures such as emergency plans, mutual aid agreements, resource inventories, warning procedures, training exercises and emergency communications systems.
- **Response activities** designed to combat emergencies when they have occurred. These include measures such as the implementation of emergency plans, activation of emergency operations centres, mobilization of resources, issuance of warnings and directions, provision of medical and social services assistance, and declaration of emergencies as enabled by appropriate legislation.

- **Recovery activities** designed to help restore the environment or communities to their pre-emergency condition. These include measures such as physical restoration and reconstruction, economic impact studies, counselling, financial assistance programs, temporary housing, and health and safety information.

The government agencies that have primary roles in managing interface fire risks include:

- Provincial Emergency Program in the Ministry of Attorney General
- Protection Branch in the Ministry of Forests
- Office of the Fire Commissioner in the Ministry of Municipal Affairs
- Local governments

The Provincial Emergency Program

The Provincial Emergency Program is mandated to serve as the provincial coordinating agency for emergency prevention, preparedness, response and recovery strategies for all specified hazards

The Emergency Program Act came into force November 1, 1993, and was revised in 1996. The Act lays out measures to protect public safety in emergencies or disasters. Emergency is defined as "a present or imminent event that is caused by accident, fire, explosion or technical failure or by the forces of nature, and requires prompt coordination of action or special regulation of persons or property to protect the health, safety or welfare of people or to limit damage to property." The definition is purposely broad in scope to enable response to a wide range of events caused by accident or forces of nature. The Act was developed with advice and assistance provided by the Union of British Columbia Municipalities and emergency preparedness specialists from numerous provincial government ministries, Crown corporations and agencies.

The Act designates the Provincial Emergency Program as the provincial government's emergency management coordinating agency (Exhibit 8). The Emergency Program Management Regulation designates the Provincial Emergency Program as the funding agent and co-chair of the Inter-Agency Emergency Preparedness Council, whose purpose is to facilitate the coordination and consistency of emergency plans and procedures developed by individual ministries for their assigned hazards (e.g., Ministry of Forests is assigned responsibility to coordinate the provincial response to wildfire,

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Exhibit 8

Roles of provincial and local government agencies in managing interface fire risks

	Provincial Emergency Program	Ministry of Forests Protection Branch	Office of the Fire Commissioner	Local governments
Primary Level of Focus	*Provincial emergency management*	*Provincial wildfire management on Crown land*	*Senior fire safety authority for provincial communities*	*All aspects of emergency management within their communities*
Prevention	Provincial coordinating agency for emergency prevention	Primary organization mandated to conduct activities to prevent and limit the impact of wildfires on Crown land	Senior provincial fire safety authority mandated to conduct activities to prevent and limit the impact of community fires	Primary organization mandated to conduct activities to prevent and limit the impact of community fires
Preparedness	Provincial coordinating agency for emergency preparedness	Primary organization mandated to conduct activities to prepare to respond to wildfires on Crown land	Senior provincial fire safety authority mandated to help communities prepare to respond to community fires	Primary organization mandated to conduct activities to prepare to respond to community fires
Response	Provincial coordinating agency for emergency response	Lead provincial organization coordinating response to wild-fire on Crown land, including interface fire	Senior provincial fire safety authority mandated to assist community response to major fires	Primary organization mandated to respond to community fires
Recovery	Provincial coordinating agency for emergency recovery	Agency mandated to restore property damaged as a result of fire suppression operations	No mandated responsibilities	Primary organization mandated to conduct activities to help communities recover from fires

Source: B.C. Ministry of Forests, B.C. Ministry of Municipal Affairs and the B.C. Provincial Emergency Program

including interface fire). The scope of the council's operations includes developing and promoting policies and procedures for a government-wide emergency response management system (described later in this report).

The Provincial Emergency Program, as an essential part of the public safety network of British Columbia, is expected to be the leader in emergency management, helping people to prepare for, respond to and recover from emergencies and disasters. Consistent with its mandate and the emergency

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management model, the program's stated mission is to enhance public safety and reduce property and economic loss from actual or imminent emergencies or disasters by:

- preventing and mitigating the effects of emergencies and disasters through education and awareness;
- promoting preparedness through planning, training and exercising;
- coordinating and assisting in response activities; and
- developing and implementing recovery measures.

In the area of prevention, the Emergency Program Act requires the Minister of Attorney General to: conduct surveys and studies to identify and record actual and potential hazards that may cause emergencies or disasters; review and recommend modification of local emergency plans of local authorities; establish training and exercise programs; and provide support to volunteers.

The Provincial Emergency Program is also mandated to prepare and maintain a hazard, risk and vulnerability study that identifies potential emergencies and disasters that could affect all or any part of British Columbia. As part of this study, an assessment of the potential impact on people or property of these emergencies and disasters must be conducted.

In responding to emergencies, the Provincial Emergency Program is required to assist governments to help ensure that emergency and evacuation plans are implemented, other involved agencies are contacted, an emergency coordination centre is established, evacuees are transported, and search-and- rescue activities are conducted.

Once an emergency is over, the Provincial Emergency Program has the mandate to assist the affected community with recovery and the return to normalcy.

The Provincial Emergency Program assists in the management of interface fire risks, but to date the agency has not given significant attention to this issue

We found that, to date, the Provincial Emergency Program has had limited direct involvement with the interface fire issue. The agency's efforts have been focused on other areas of emergency management, such as developing an emergency response management system for the province (BCERMS) and planning for other emergencies (such as flooding and earthquakes) that the agency has determined are more demanding of its limited resources.

This is not to say that the Provincial Emergency Program has done nothing to aid interface fire risk management. For example, some of its field representatives participate in community-based groups focusing on interface fire issues. As well, the agency has contributed to interface fire preparedness through the work it does to promote ministry and municipal emergency planning and to train local emergency response personnel. In the event of interface fire emergencies, the Provincial Emergency Program is available to assist local authorities with responding to or recovering from fires they are incapable of dealing with effectively. And agency personnel are also available to assist in the coordination of emergency plans between local authorities and the government, government corporations and government agencies. This happened, for example, during the Silver Creek fire near Salmon Arm in 1998.

Recently, the Provincial Emergency Program has been giving more attention to the interface fire issue to determine whether it should take on a greater role in its management.

The Provincial Emergency Program has developed an interface fire emergency response framework

The Emergency Program Act requires the Attorney General (through the Provincial Emergency Program) to prepare coordinated emergency preparedness plans. These overall plans must include hazard-specific plans as well as strategies that assign functionally based roles to provincial government ministries and provincial Crown corporations and agencies. Planning is required for preparedness, response and recovery. The aim is to ensure better overall government management of disasters and emergencies. The Emergency Program Management Regulation identifies wildfire (including interface fire) as a specified provincial hazard. The Provincial Emergency Program has recently developed an interface fire emergency response framework to help coordinate its efforts with that of other agencies involved in interface fires.

The Ministry of Forests

The Ministry of Forests has no specific mandate to undertake fire prevention, preparedness and recovery activities outside the Crown forest

The Ministry of Forests has long been associated with suppressing forest fires in the province. Its legislated mandate, according to the Forest Practices Code of British Columbia Act, is tied to managing fire risks in and around the Crown forest. Responsibility for achieving this forest protection mandate has been delegated to Protection Branch (Exhibit 8). The Emergency

Courtesy: B.C. Ministry of Forests

Dropping fire-retardant on a forest fire

Program Management Regulation also identifies the ministry as the lead agency in coordinating the provincial response to wildfire emergencies, including interface fires. Legislation, however, gives the ministry no explicit role in prevention, preparedness and recovery activities related to interface fires.

Although it is not specifically mandated to do so, the Ministry of Forests actively works to prevent interface fires and to mitigate their effects if they occur

Despite the Ministry of Forests having no formal mandate to carry out prevention activities within local jurisdictions, it recognizes the importance of such work and has, for several years, directed some of its resources towards meeting this need.

For example, the ministry has:

- assisted with public education efforts aimed at alerting the public to the cost, risk and dangers of interface fires, particularly as they increasingly threaten homes and buildings;
- managed the use of fire (debris burning) for all areas not governed by local bylaws;
- completed risk assessments in and around some communities; and
- carried out some risk mitigation work in the form of forest fuel reduction.

In our opinion, it makes sense for the Ministry of Forests to take an active role in prevention work at the community level. Given that the ministry has overall responsibility for suppressing wildfires on Crown land and in unorganized areas and for coordinating the provincial response to interface fires,

it is in the agency's interests to prevent them and to limit their effects if they occur.

In the area of response preparedness, the ministry maintains its firefighting resources in a state of readiness. This involves training its employees in safe and effective forest firefighting techniques and making sure that its employees have access to adequate and sufficient firefighting equipment. Ministry employees, however, are neither trained nor equipped to safely fight structural fires.

Because the Ministry of Forests has no formal mandate to undertake community recovery activities following an interface fire, it does not involve itself in this role. It does, however, take responsibility for restoring sites damaged by any fire control actions it carries out.

The Ministry of Forests' firefighting priorities are not clearly reflected in its legislated mandate

When the Ministry of Forests Protection Branch is engaged in fighting interface fires, it needs to make rapid decisions about where to focus its efforts. Ministry staff understand that their firefighting priorities are first to protect human life, then to protect personal property, and finally to protect resources. However, this prioritization of efforts is not clearly reflected in the ministry's legislated mandate, the focus of which is on protection of forest resources. Ministry staff members do not disagree with the appropriateness of these priorities, but some are concerned that they may be challenged by forest companies if, in concentrating their efforts on protecting nearby communities, significant forest resources are lost. Other jurisdictions have faced this same issue (e.g., Alberta and Oregon) and we understand that both plan to formalize their firefighting priorities in legislation.

The Office of the Fire Commissioner

The Office of the Fire Commissioner is the senior provincial authority over fire safety, including prevention, preparedness and response in British Columbia communities

The Fire Services Act makes the Office of the Fire Commissioner the senior fire authority in the province over fire safety within local communities. The mandate of the Office of the Fire Commissioner focuses on the management of fire risks in provincial communities, and this encompasses a variety of prevention, preparedness and response initiatives. The office has a relatively small staff that

provides services such as administration and enforcement of fire safety legislation, training of local assistants to the Fire Commissioner, collection of fire loss statistics, fire investigation, fire inspection, advice to local governments on delivery of fire protection services, public fire safety education and firefighter certification. Response activities are restricted to major fire emergencies (Exhibit 8).

The Office of the Fire Commissioner plays an important role in managing interface fire risks

Some of the mandated work of the Fire Commissioner's office directly affects the management of interface fire risks in the province. For example, under the Fire Services Act, the Fire Commissioner undertakes public education (such as studying methods of fire prevention) and advises municipalities on the enactment and enforcement of bylaws for fire prevention. The Office of the Fire Commissioner also:

- collects and publishes information on fire losses in British Columbia annually;
- appoints and trains local assistants to the Fire Commissioner;
- implements fire safety regulations;
- develops and delivers introductory courses to local assistants to the Fire Commissioner, as well as courses on inspections and on specific subjects within the British Columbia Fire Code;
- provides training associated with fire investigation; and
- administers the British Columbia Fire Service Certification Program, which provides certification of fire service personnel in accordance with the British Columbia Fire Service Training Standards.

In the event of an interface fire, the Fire Commissioner orders the evacuation of buildings or areas put in imminent and serious danger by fire or explosion. Under the Emergency Program Act and the Emergency Program Act Management Regulation, the Fire Commissioner also has authority over all structural firefighting and fire prevention services should a provincial emergency be called.

In a few jurisdictions of the province with significant interface fire risks, the Fire Commissioner's representatives have been active in establishing and participating on local committees whose concern with the interface fire issue is significant (e.g., the Thompson-Okanagan Interagency Committee, the Coastal Interagency Interface Committee and the Kootenay Interface Steering Team).

Thus, although the Office of the Fire Commissioner does not focus its attention on the interface fire issue, the agency's activities contribute to the management of interface fire risks by helping to prevent community fires that could cause an interface fire and by assisting in response to such fires if they occur. In this way, the Office of the Fire Commissioner fills an important role in managing interface fire risks.

Local governments

Local governments are mandated to take the steps needed to manage interface fire risks within their boundaries

Interface fires can start either within the boundaries of a local government's jurisdiction or outside, subsequently moving into the area. This makes it important that communities take steps to manage these risks.

Various legislative authorities exist to enable a community to take steps to: prevent interface fires from occurring within its boundaries; prepare to respond to them; combat the fires when they occur; and restore the community to its pre-fire condition (Exhibit 8).

In the area of prevention, the Local Government Act authorizes a municipal council to inspect premises for conditions that may cause fire, and to require the owners or occupiers to remove anything that the fire chief deems a fire hazard. Municipal Building Regulations authorize the council to establish areas known as "fire limits" and to ensure the buildings constructed in these areas incorporate precautions against fire. The council may also require anyone carrying on an industrial activity to take precautions to prevent the escape of fire. Bylaws are used to manage the use of fire for activities such as debris burning.

In preparing for interface fires, the Local Government Act authorizes (but does not require) the municipal council to establish a fire department and give it responsibility for fire suppression and prevention, or to make agreements with other agencies to either assist or provide fire protection. The Act also authorizes local governments to require developers to install a water distribution system and fire hydrant system within a subdivision (although it does not regulate the water pressure). And subdivision plans must go through an approving officer before the subdivision can be registered.

As well, the Emergency Program Act requires a local authority—a municipality or an electoral area in a regional district that has been granted the powers of a municipality

—to establish a local emergency plan to deal with emergencies and disasters (including fire). The plan must address the potential emergencies and disasters that could affect the authority's jurisdictional area and reflect its assessment of the risk of occurrence and potential impact such an occurrence could have on people and property. The legislation also requires a local authority to be able to enact its emergency plan. For example, a local authority must:

- require a periodic review and updating of the local emergency plan and establish a procedure for that review and revision;
- establish and maintain, for all emergency response staff assigned responsibilities in the plan, a program of emergency response exercises and a training program;
- identify the procedures by which emergency resources may be obtained from sources within or outside its jurisdictional area;
- establish the procedures by which the plan is to be implemented;
- establish procedures by which those persons who may be harmed or who may suffer loss are notified of an emergency or impending disaster; and
- coordinate the provision of food, clothing, shelter, transportation and medical services to victims of emergencies and disasters, whether that provision is made from within or outside the local authority's jurisdictional area.

According to the Emergency Program Act and the provincial government's emergency response strategy, local governments must provide the initial response to most emergencies occurring within their municipal boundaries. They may request assistance from neighbouring municipalities, private sector agencies, the provincial government or the local offices of the federal government, but the responsibility for the overall direction and control of response operations remains theirs. The role of the provincial government in these circumstances is to provide material support, advice, expertise or such other assistance as requested.

Through a provincial declaration of a state of emergency, the provincial government, may—in an organized area of the province—assume the direction and control of response operations if:

- a catastrophic event has rendered the local government incapable of providing direction and control;

- an emergency situation has rendered the local government incapable of providing adequate direction and control and the local government has requested the provincial government's assistance; or
- the emergency situation falls under provincial jurisdiction.

When essential services are interrupted during an emergency or disaster, a local authority is expected to:

- establish the priorities for restoring those essential services it provides; and
- recommend to service providers the priorities for restoring all other essential services.

In unorganized areas of the province where there is no local authority, the provincial government is responsible for emergency response operations.

Some local governments use their authority to manage interface fire risks in their communities, but it does not happen consistently around the province

The extent to which local governments help with the management of interface fire risks in their communities depends on the use they make of their legal powers to undertake prevention, preparedness, response and recovery activities. That use varies significantly around the province. Some communities, we found, undertake risk identification and mitigation work, but it is not always adequate. A few communities are using legal mechanisms to help reduce their exposure to interface fire risks, but such effort does not happen enough. (There are cases of some communities that actually require the use, for aesthetic reasons, of building materials that pose fire risks [e.g., untreated cedar shake roofs].) Some local officials informed us that the limited actions by local governments to reduce interface fire risks relate to cost. Local governments are reluctant to raise taxes to implement the needed measures, and in some instances the affected jurisdictions have only a small tax base to work with anyway.

The state of community emergency planning, a legislated requirement in many locations, also varies considerably both in terms of whether such plans have been developed or not and, where they have, how adequate they are. While response planning is relatively good in some jurisdictions, there is significant room for improving the overall management of interface fire risks at the local community level.

First Nations communities

Government mandates to carry out interface fire emergency management in First Nations communities is unclear and does not happen consistently around the province

Because wildfires do not respect boundaries, the provincial government must ensure that such fires, regardless of their locations, are controlled in order to protect life, personal property and resources associated with the provincial forest. In this respect, First Nations communities present a special set of circumstances to government agencies responsible for managing interface fire risks.

About half of the jurisdictions we contacted reported that a First Nations community exists within or adjacent to their fire district. First Nations reserves fall under the jurisdiction of the federal government, however, provincial firefighters provide fire suppression services according to an agreement with the federal government and an established payment schedule. Other aspects of emergency management on Aboriginal reserves—prevention, preparedness and recovery matters—remain the responsibility of Band Councils and the federal government.

Many local communities in British Columbia have voluntarily included their First Nations neighbours in their emergency programs, but a significant number have not. As a result, some First Nations communities may not be adequately prepared to deal with a major interface fire. Most often, such involvement addresses the mutual aid potential for sharing evacuation notices, routes, transportation and reception centres. As well, some local fire departments provide structural fire suppression services to First Nations communities that lack their own services. In several areas, the Ministry of Forests Protection Branch has included First Nations communities in its public awareness efforts.

Given recently signed treaties, the federal government will soon no longer be responsible for paying for fire protection services. In these cases, it will become increasingly incumbent upon the provincial, local and First Nations governments to work out arrangements to replace the current federal-provincial agreement for wildfire suppression services. In our opinion, these arrangements should also address prevention, preparedness and recovery matters.

Recommendations:

- ***The provincial government should establish an Interface Fire Committee under the provisions of the Emergency Program Act to develop strategies and action plans to improve the management of interface fire risks in the province. The committee should be adequately funded and consist of representatives from the Provincial Emergency Program, the Ministry of Forests, and the Office of the Fire Commissioner. The Provincial Emergency Program—the provincial government's emergency coordinating agency and leader in emergency management—should chair the committee.***
- ***The Interface Fire Committee should clarify roles and responsibilities related to managing interface fire risks.***
- ***The Ministry of Forests should formalize in legislation its response priorities relating to the protection of human life, property and natural resources.***

preventing interface fires

The interface fire issue is a significant problem that is likely to escalate in the province as people continue to move from urban areas to rural ones. As a result, we expected the government agencies with primary responsibility for interface fires to be undertaking programs designed to prevent or mitigate the effects of interface fires, particularly in high and moderate risk areas. We also expected prevention programs to be undertaken regularly, given that the populations in the affected areas change over time and there is an ongoing need to educate the new residents.

Conclusion

Overall, fire and emergency response experts believe that the prevention work done in high and moderate interface fire risk areas in British Columbia has been inadequate. This means that some communities are exposed to unnecessarily high interface fire risks.

Although firefighting and emergency preparedness agencies are well aware of the risks of a major interface fire, other key community individuals with long-term influence on the management of such fire risks are less aware. It is not surprising, then, that different levels of importance are attached to the management of interface fire risks by provincial agencies and local governments.

While we think that reasonable programs are being used to help raise awareness of interface fire risks and mitigation techniques in affected communities, fire experts in the province do not believe that these efforts have been adequate or effective or that either level of government is doing enough to improve the levels of awareness.

The Ministry of Forests Protection Branch does more than any other group to formally assess interface fire risks around the province, but a greater number of high and moderate risk areas need to be assessed and the results shared with local groups.

Generally accepted fire risk mitigation activities are used inconsistently in communities at risk to interface fires. Even when such measures are employed, non-compliance is a major problem, putting these communities at higher risk of experiencing more significant losses should an interface fire strike.

Findings

There are a number of prevention activities that provincial and local government agencies can do to help manage interface fire risks, including:

- designing and implementing effective programs to raise awareness of the risks;
- assessing fire risks around the province; and
- implementing cost-effective risk mitigation programs.

In the following sections, we present our assessments of how well governments have performed these activities.

Raising awareness of the risks

Representatives of provincial and local firefighting and emergency response agencies are adequately aware of interface fire risks

The ability to manage the threat of interface fire depends on an awareness of the risks. We found an adequate level of awareness among the provincial agencies that have a primary role in dealing with interface fires: the Ministry of Forests Protection Branch, Provincial Emergency Program and Office of the Fire Commissioner. We contacted many members of Protection Branch (both headquarters and field staff) and found them to be adequately aware of the risks in their respective regions. All were able to give an overview assessment of the risks present in various regions of the province—low, moderate, and high—and all were well aware of past interface fires in these areas. In addition, we found Protection Branch field staffs to be very familiar with which communities in their areas of responsibility either do have or do not have local fire departments, and to know each one's response capabilities in terms of size, training and access to adequate equipment.

We also contacted representatives of the Provincial Emergency Program and Fire Commissioner's Office and found them to be adequately aware of interface fire risks across the province. However, the Provincial Emergency Program is only in the early stages of focusing on such fires as a separate issue in the same way it has done with flooding and earthquake preparedness, and it only needs to become involved in a limited number of these fires each year. Similarly, the Fire Commissioner's Office has a limited role in interface fires. As a result, representatives of both agencies have an acceptable knowledge of interface fire risks, but it is more limited than that of the Protection Branch.

Courtesy: B.C. Ministry of Forests

Public education display provides opportunity for local fire official to meet with community members

At the local level, we found that many fire department members and emergency program coordinators had relatively high levels of awareness of interface fire risks in their regions. They were also able to provide reasonable assessments about their regions: levels of risk, past interface fire experiences, and capabilities of local fire departments and emergency response agencies.

Although no formal mechanisms are in place with which to assess the effectiveness of interface fire risk awareness programs aimed at the local level, evidence suggests that the programs need improvement

Local authorities have the responsibility and authority to take the steps needed to reduce interface fire risks within their boundaries. To make informed decisions, it is important that community leaders and residents be aware of the risks present in their communities and the steps they can take to mitigate those risks. At the local community level, the Ministry of Forests Protection Branch supports and assists local governments in their efforts to raise awareness and has taken on a significant share of the responsibility for raising awareness of interface fire risks in unorganized areas. The Office of the Fire Commissioner and the Provincial Emergency Program have, to date, taken on lesser roles in raising local awareness of interface fire risks.

We found no formal assessments of the effectiveness of this work, but do have evidence that improvements are needed to increase fire risk awareness in communities. For example,

fire experts responding to our survey reported that awareness efforts at the local level have not been adequate. They said that, despite the efforts made, there continues to be an overall low level of awareness even in communities with a high or moderate risk of interface fire. They also said while awareness is relatively high among fire department members and emergency program coordinators, it is low among municipal planners, elected officials, developers, real estate agents and the general public. Fewer than 25% of the local officials who responded to our survey had attended a recent session on the topic in the past three years and only about 41% who live in areas of high or moderate risk had done so. The Ministry of Forests received the highest rating for its work, followed by the Fire Commissioner's Office and the Provincial Emergency Program. Most respondents thought their local governments should be doing more to raise awareness and, overall, respondents felt neither level of government was doing enough.

One possible reason for the relatively low degree of awareness at the local level, ironically, is the success of fire protection agencies in suppressing fires. Fire experts indicated that this may contribute to a false sense of security among residents in wildland-urban interface zones, and may account for the limited actions being taken at the political level to control interface fire risks.

Another reason for awareness still being low among several groups seems to be the frequency of "awareness-raising" work being done. We found that the levels of effort varied in different parts of the province, depending on the value the local Protection Branch office places on the work and the time staff have available for it. Staff told us they focused most of their efforts on regions that were receptive to education efforts, feeling that this provided the best chance of bringing about improvements. Furthermore, while some Protection Branch offices have covered most of their region with awareness material, others are not at that stage.

A third issue that may affect the fire awareness of local groups is concern about liability issues. Some of the local officials we contacted raised this issue, feeling that by acknowledging the existence and potential magnitude of the problem, their liability will increase. We heard several different viewpoints on this idea, which suggests it is an area of confusion that may be limiting progress in raising awareness of the interface fire issue.

Local interagency groups present an important means of raising awareness and managing interface fire risks

Some areas of the province have established interagency committees, with representatives from provincial and local government agencies and the general public. The committees focus much of their efforts on managing interface fire risks at the local level, including raising awareness about those risks. Fire and emergency response personnel participate on these committees, and they told us they believe that the committees are effective vehicles for managing interface fire risks. For example, the Thompson-Okanagan Interagency Committee has helped to raise awareness in that area and to increase the use of legal mechanisms to encourage fire-resistant developments. The Coastal Interagency Interface Committee has been actively involved in fostering simulation exercises in that region. And the Kootenay Interface Steering Team has also played a significant role in managing interface fire risks. The group was instrumental, for example, in organizing a large-scale simulation in Nelson in 1999 that helped to raise awareness and show weak points in the emergency management system. Nevertheless, uncertain funding is a challenge for these committees, as is securing ongoing support from key organizations to allow their employees to participate on the committees. The result is a constant risk of losing the benefits associated with these organizations.

In our opinion, interagency committees are a key component to managing interface fire risks and governments should encourage and support their work.

Recommendations:

- ***The Interface Fire Committee should work to raise awareness of interface fire risks in the province, with emphasis in high and moderate risk locations.***

  In formulating such a strategy, consideration should be given to the following:

  - *Making presentations to community residents, local officials and groups with influence in local governments such as the Municipal Insurance Association, the Planners Institute of British Columbia and the Union of British Columbia Municipalities. The presentations should include information on interface fire risks, risk reduction and mitigation techniques, general emergency management, and potential liability issues of importance to local officials and response personnel.*

- *Identifying high and moderate risk areas that would benefit from having local interagency committees with a focus on interface fire issues, and encouraging and supporting the establishment of such committees.*
- *Developing the means to measure, periodically, the extent to which efforts made to raise provincial awareness of interface fire risks have been successful, and revising the programs based on the results.*

- ***The Ministry of Forests should continue to have a significant role in developing and delivering programs to raise community awareness about interface fire risks, and should formalize its plans for doing this work.***
- ***The Provincial Emergency Program should encourage emergency program coordinators to discuss interface fire risks with local emergency planning committees and to seek the involvement of the committees in raising public awareness about the risks.***

Assessing the risks

The Ministry of Forests has done more than any other group to formally assess interface fire risks in provincial communities, but it needs to take additional steps in high and moderate risk areas

Another important element in interface fire prevention is risk assessment. Formal assessments of the risks can help the provincial government and local communities develop appropriate prevention programs, set priorities, identify cost-effective mitigation work, and ensure that the greatest effort is devoted to the areas with the greatest need. We expected to find that:

- the levels of risk are formally assessed in all communities of the province, particularly those with high or moderate risk of interface fire;
- the assessments are prepared using standard criteria to promote consistency;
- the assessments are shared with local officials; and
- the assessments are updated to remain current.

Over the past several years, the Ministry of Forests Protection Branch has been preparing overview hazard maps depicting factors that could promote wildfires (including interface fires). The Branch is focusing its efforts on unorganized areas of the province, as organized areas are expected to manage fire risks within their boundaries. Protection Branch

managers estimate they have completed overview mapping for a significant part of the high and moderate risk areas for which they are responsible. The Branch believes the maps continue to reflect current risk conditions even though some were prepared several years ago. Updating cycles are determined by Protection Branch field offices based on factors such as the rate of change in the community and the funding and staff available to do the work. However, most field offices reported to us their intent to complete or upgrade mapping where required.

Formal assessments specific to individual communities are also an important tool in managing interface fire risks. Such assessments are useful in targeting action, communicating risks to others, tracking the extent of the problem and monitoring efforts made to alleviate those risks. Protection Branch has prepared some community-specific risk assessments primarily for unorganized areas—and has shared the information with residents and local officials. Community-specific risk assessments within organized areas is a local government responsibility. To date, efforts at this level have been limited. Only 18% of fire chiefs responding to our survey reported there being a written risk assessment for their jurisdiction. About half of all jurisdictions in high or moderate risk areas have no written assessments.

Standard criteria are being used to prepare formal interface fire risk assessments

The use of accepted standards to prepare formal risk assessments enhances the validity and accuracy of each assessment and helps promote consistency of the analysis across different jurisdictions. Standards also help to reduce inadvertent research bias and allow comparisons to be made among affected areas.

We found accepted standards exist in British Columbia and are being used to do the work. One source is the U.S. National Fire Protection Association (NFPA) Standard 299 that addresses such community features as water supplies, road widths and subdivision design. As well, the Beware and *Prepare Community Planner* was developed and published in 1994 as a joint effort of the Ministry of Forests and the Fire Commissioner's Office. The planner, based on NFPA Standard 299, provides standards that can be adopted in full or in part by jurisdictions to reduce interface fire risks in their communities. The two agencies have maintained ongoing efforts to make the planner available throughout the province. As well, Protection Branch is thinking of adopting the newer standards contained in Alberta's recently released *FireSmart*

publication. FireSmart extends the work started in the *Beware and Prepare Community Planner.*

More than half of the fire chiefs (55%) responding to our survey reported their awareness of the planner, and of those in high and moderate risk areas, about 73% said their communities use the guide. Given that the publication has been available since 1994, this finding suggests that there is still room to make other communities aware of the standards available for preparing formal risk assessments.

Recommendations:

- ***The Interface Fire Committee should encourage organized areas of the province to assess interface fire risks in their communities.***

  In formulating such a strategy, the committee should consider:

  - *Examining the benefits of updating the Beware and Prepare Community Planner to reflect more current information and standards or, alternatively, to consider adopting the FireSmart publication as the standards to be used and promoted in British Columbia.*
  - *Encouraging local and regional governments to make formal community-specific assessments of interface fire risks (e.g., through hazard mapping) in all high and moderate risk areas within their boundaries, over a reasonable time period and in enough detail to support mitigation decision-making, evacuation planning, and public education.*
  - *Coordinating the collection of examples of how communities in the province use interface fire risk management standards to assess the risks in their communities, and disseminating this information to other provincial communities.*
  - *Encouraging community development and planning directors to use formal risk assessments as a means of promoting "fire-resistant communities."*

- ***The Ministry of Forests should complete hazard mapping of unorganized areas of the province over a reasonable time period, with emphasis on high and moderate risk areas.***

- ***The Provincial Emergency Program should complete the development of a BC Hazard Risk Vulnerability Assessment model and encourage its use at the local level to assess interface fire risks.***

Courtesy: B.C. Ministry of Forests

Recent mitigation activities including a fire-retardant roof and defensible space will help save this home

Mitigating the risks

Local governments in many high and moderate risk areas of the province are not adequately committed to reducing their exposures to interface fire risks

Mitigation means preventing or reducing the consequences of interface fires. It involves activities such as reducing excess vegetation (which provides fire fuel), adopting building codes that promote fire-resistant property development, adopting land use restrictions to control activities that increase fire risks, and implementing insurance incentives that promote the use of fire-resistant building materials and property maintenance. Many of these activities are the responsibility of local governments.

We expected local governments in high and moderate risk areas would have:

- developed and adopted long-term strategies to mitigate interface fire risks; and
- taken specific steps to mitigate the risks.

A long-term mitigation strategy to reduce interface fire risks includes all efforts aimed at reducing both the likelihood of structural damage from wildfire and the magnitude or severity of any consequences.

We found that, of our survey respondents who live in high or moderate risk areas, 41% reported that their jurisdictions have an overall mitigation strategy, 49% have no strategy, and 10% are not sure. In our view, these results indicate a

significant absence of commitment to risk reduction and leaves these communities more exposed to the risk of significant injuries and property losses resulting from interface fires.

Many jurisdictions with high or moderate risk of interface fire do not address such risks in their Official Community Plans, and most do not include wildfire hazard assessments in their land use planning work

Long-term solutions to the interface fire threat must be dealt with in the context of other land use issues on a regional—or at least community—scale. In our view, the Official Community Plan used by incorporated municipalities to direct long-term community development should include property development and zoning controls to help address interface fire risks. In some areas this is already being done. Among those jurisdictions with high or moderate risk of interface fire, more than half (57%) of the development and planning directors who responded to our survey indicated such risks are addressed in their Official Community Plan or other plans. About 37% said their Official Community Plan and related plans do not address interface fire risk. The remaining 6% were not sure.

When asked if their jurisdictions included wildfire hazard assessments in land use planning, only 45% of the chief administrative officers in high or moderate risk areas indicated they did. An equal number said they did not include hazard assessments in land use planning, and the remaining 10% were not sure.

Failure to include interface fire risk controls in Official Community Plans and land use planning increases the chance of such measures being overlooked as the community grows.

Many local governments in high and moderate interface fire risk areas do not make adequate use of the many mechanisms available to control the risks

Mitigating interface fire risks would be hampered if there were a lack of knowledge about viable solutions, but this is not the case. The Beware and Prepare Community Planner, FireSmart and the NFPA Standard 299 all cover the many risk reduction methods available to communities. These include, for example, controls over:

- hazardous activities such as open burning, to limit the possibility of creating dangerous fire situations;
- construction materials, to promote the use of fire-resistant roofing and other building products;

- property development, to promote a community infrastructure that facilitates firefighting actions (e.g., adequate road widths, turn-arounds, signage and water supply);
- property maintenance, to promote the creation of defensible space around structures; and
- landscaping, to promote the use of fire-resistant vegetation.

Although fewer than half of the high and moderate risk jurisdictions responding to our survey have an ongoing mitigation strategy, 59% have adopted some of the controls noted above to reduce interface fire risks. However, 36% have taken no mitigation steps, and another 5% are not sure whether such steps have been taken or not.

The most common method reported to be in use is control over open burning (32%) through, for example, burning bylaws. The next most common method being applied is control over water supply (22%). (Adequate water supplies serve not only the needs of fighting wildfire, but in some instances are also necessary to meet insurance requirements for structural fire protection.) Other common risk reduction techniques used by communities are controls over road width (10%), turn-arounds (12%) and street signage (10%). Very seldom used are some of the most important controls for preventing or reducing the consequences of interface fires—such as creation of defensible space around structures (5%), controls over construction materials (3%) and use of landscape vegetation to control fire spread (2%).

Part of the reporting sample in the above are the smaller communities in the province that have not applied for "local authority status" under the Local Authority Act. These jurisdictions are required to submit property development plans to an approving officer in the Ministry of Transportation and Highways. The Ministry of Forests Protection Branch tries to work with the Ministry of Transportation and Highways approving officers to provide input on new development plans related to interface fire concerns. However, while this has been done in some instances, there are a couple of difficulties with the arrangement:

- It does not happen consistently throughout the province because each local authority is responsible for its own approvals of new development. Such variability makes it difficult to garner widespread support for the idea of requiring developers to include interface fire prevention features in their plans.
- Determining which agency will be responsible for ensuring that the recommended actions are taken is not clear.

A few approving officers also noted that, given the potential loss to the local economy if a requested change causes a development to be abandoned, they sometimes avoid complicating development discussions with concerns over interface fire issues.

Another important risk control method is to reduce the amount of forest fuel (vegetation) near and within communities. Protection Branch has a few options it uses to help control forest fuel increases on Crown land near high and moderate risk communities. One is to plan its forest harvesting and silviculture work in a way that reduces the fuel on Crown land. Although the ministry is not responsible for undertaking fuel reduction within municipal boundaries or on private land, it also offers information and guidance to communities that want to undertake such work. Occasionally funds are available that allow the ministry to undertake some mitigation work near a community as a "demonstration project" to encourage the community itself to take action. We found, however, that few communities (11%) had undertaken fuel reduction activities of any significance. In some areas, Crown timber in a risk area was reported to have been harvested and sold to defray the costs of the fuel reduction work. Overall, though, while some fuel reduction is taking place, fire experts we contacted concluded that not enough is being done in high and moderate risk areas to decrease interface fire risks.

Failure to employ the many established methods for mitigating interface fire risks increases the chance that high and moderate risk communities will experience significant injuries and property losses should a significant fire occur.

Even when jurisdictions enact fire risk reduction controls, non-compliance is a problem

Where jurisdictions have enacted controls to reduce interface fire risk, they still face the challenge of non-compliance by developers and individual property owners. Just 16% of respondents to our survey reported that developers always comply with controls in their jurisdictions, and nearly half (46%) said that developers only sometimes comply with control requirements.

The most common reason given for non-compliance by property developers was a lack of enforcement resources (40%). The next most common reasons were lack of political support (23%) and weak legal avenues by which to counter non-compliance (22%). When it comes to controls aimed at individual property owners, non-compliance is an even greater problem.

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Legal mechanisms used in selected jurisdictions to control interface fire risks

Several communities in British Columbia are using a variety of legal mechanisms to reduce interface fire risks. For example:

- The City of Kamloops' Official Community Plan identifies the risk of building in wildland-urban interface areas of the community through steps that are to be taken to obtain a building permit for individual properties or specific criteria to be met when applying to develop a subdivision. For example, there is a requirement that a covenant go on an individual property to be developed in the interface identifying the use of specific roofing materials, spark arrestors and other fire-retardant features.
- The District of Salmon Arm has placed restrictive covenants, as a condition of subdivision approval, on properties that have been created by subdivision in the past five years. This process alerts purchasers that their property is in an area with high risk of interface fire and instructs them as to what they can do to be safer (e.g., clearing and keeping combustibles away from their homes).
- The Regional District of Central Okanagan requires a wildfire hazard report, prepared by a professional forester, when an application for change in land use (rezoning) is brought forward for the Regional Board's consideration. It also deals with wildfire at the time of subdivision by requiring hazard reduction and applying restrictive covenants.
- The City of Vernon has a bylaw that includes a map identifying interface fire areas and requires use of fire-resistant construction materials and/or internal sprinkler systems for any building that is to be constructed in this area. It also requires—as a condition of issuing a building permit in that area—that a covenant be placed on the lands, defining defensible space between structures and the wildland and the maintenance of this space.
- In Summerland's Official Community Plan, the city has adopted a wildland interface strategy. If a developer is going to develop in such an area, a number of criteria must be met, including: incorporation of fire breaks and/or fuel modifications as established by the Ministry of Forests, encouraged use of fire-resistant materials and techniques in building design, installation of all services below ground, installation of a water system designed to ensure adequate water flows in case of emergencies, and provision of two roadways providing access to the development.

Failure to enforce laws aimed at controlling interface fire risks may send the message to the community that the issue is not important. It may also raise legal liability issues and increase the likelihood of losses in the community should a major interface fire occur.

Stakeholders believe that mitigation costs must be shared by all who benefit

The benefits of risk reduction come at a cost, and this raises the question as to who should pay for such programs. Fire chiefs responding to our survey favoured the following as contributors: the provincial government (27%); insurance companies (24%); residents, farmers, ranchers and other business owners at risk should pay (17%); regional districts (17%); and municipalities (12%). In our research, we found that the Province of Alberta provides the forest industry with incentives to promote its involvement in risk reduction projects.

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The Insurance Bureau of Canada, through the Institute for Catastrophic Loss Reduction (an initiative of the insurance community), is interested in working with governments, scientists and experts to examine Canada's increasing vulnerability to natural hazards. Recommendations from the institute are being used to create a Natural Disaster Reduction Plan, which is aimed at saving lives, property and money in the event of a natural disaster. The institute's priorities are to: 1) build safer communities; 2) establish safety partnerships; 3) enhance industry awareness; and 4) promote consumer awareness. Currently, the institute is trying to develop a comprehensive understanding of the wildland-urban interface fire problem in Canada. This endeavour is being hampered by the overall lack of statistics on interface fire incidence and severity (in terms of loss) across Canada. The insurance industry did play a significant role in sponsoring a full-scale interface fire simulation in Nelson in 1999.

Overall, communities across British Columbia—even those in high or moderate risk areas—are not adequately mitigating the risks of interface fires

We did not find any formal assessments of mitigation work carried out by communities. The majority of fire chiefs (55%) responding to our survey in high or moderate risk areas concluded that very little was being done in their jurisdiction to limit the impact of interface fires. Another 39% reported that a moderate level of action was evident. Only 3% noted a very high level of activity. Chief administrative officers and senior Protection Branch firefighters offered similar observations.

These results suggest that mitigating interface fires continues to be a widespread challenge for British Columbia communities at risk.

Recommendation:

- ***The Interface Fire Committee should encourage high and moderate risk communities to take practical steps to mitigate interface fire risks.***

  To foster progress by communities to mitigate their risks, the committee should consider:

  - *Developing a "best practices library" that includes research into the application of cost-effective mitigation strategies in other jurisdictions (e.g., Alberta, Washington, Oregon, Idaho and California) and disseminating the information to local governments.*

- *Encouraging local governments to address interface fire issues in Official Community Plans.*
- *Investigating and, where practical, incorporating the use of provincial incentives to involve the private sector in risk reduction initiatives near communities at significant risk of interface fire.*
- *Encouraging federal government officials to promote mitigation work in federal parks and Aboriginal reserves.*
- *Training Ministry of Transportation and Highways approving officers to help them recognize interface fire risks and identify solutions, and encouraging them to incorporate controls into the subdivisions they review.*
- *Consulting with the Insurance Bureau of Canada to research the potential for granting insurance premium reductions in high hazard areas of the province if property owners undertake certain mitigation actions.*
- *Investigating the potential benefits that both provincial and local levels of government might derive from funding targeted risk reduction programs.*
- *Researching options to help local and regional governments enhance compliance with local interface fire risk reduction controls.*
- *Identifying methods that local governments can use to measure periodically the extent to which risk mitigation programs have been effective.*

planning for interface fire response and recovery

In the context of fire management, response planning includes programs and activities designed to ensure that individuals and agencies will be ready to react effectively once a fire emergency starts. Response planning is critical to ensuring that imminent interface fire situations are recognized, that an appropriate level of fire protection is provided in interface zones, and that priorities are established and actions taken. The absence of carefully developed response plans can result in poor decisions and lead to costly operational mistakes or unsafe practices during an emergency.

Recovery planning includes programs and activities designed to help restore the environment or communities to their pre-emergency condition. In the context of fire management, recovery planning helps reduce losses associated with fires by speeding recovery of the community and helping individuals return to normalcy.

We expected government agencies with primary responsibilities for interface fire management to have undertaken response and recovery planning. We also expected that such plans would be designed to prepare individuals and agencies—particularly in high and moderate risk interface areas—to react effectively once an emergency has occurred and to assist the community in returning to normal within a reasonable time after the emergency is over.

Conclusion

Many aspects of response planning are done well in British Columbia and this has resulted in most interface fires being handled without major incident. Still, a few have resulted in significant property losses, and we concluded that:

- the guidelines defining the working relationship between provincial and local government firefighting agencies are unclear in some jurisdictions;
- emergency planning in many communities is in a poor state;
- parts of the province lack structural fire protection services;

- structural firefighters and emergency response personnel are inadequately trained, and the firefighters inadequately equipped to meet their wildland firefighting responsibilities in some high and moderate interface fire risk areas;
- evacuation planning is inadequate in many communities; and
- response plans are not being adequately tested and recovery planning is weak in many high and moderate risk communities in the province.

Findings

There are a number of response and recovery planning activities that provincial and local government agencies can do to help manage interface fire risks. These include ensuring that:

- working relationships between provincial and local firefighting agencies are clearly defined;
- arrangements are in place to provide additional resources, when required;
- community-based emergency plans are current enough to be effective during an interface fire;
- firefighters and other emergency responders are adequately trained and equipped;
- mechanisms for warning and evacuating residents are in place to ensure public safety;
- response planning is tested regularly; and
- community-based recovery plans are in place to help the community return to normal following a major interface fire.

The following sections assess performance in these areas.

Establishing working relationships among response agencies

The Ministry of Forests' operating guidelines clearly outline the working relationship expected between the ministry and local fire departments, but some improvements are needed

When a significant interface fire strikes a community, the most immediate issue is likely to be fire suppression. Interface fires, by definition, put structures and wildland resources at risk, so it is critical that both the wildland and structural firefighting agencies have a common understanding of their working relationships.

Provincial legislation and policy guidelines call for the Ministry of Forests Protection Branch to respond to wildfires on Crown land and in unorganized areas. Operating guidelines developed by Protection Branch require that local fire departments provide the first response to such fires within their boundaries, at their own expense. If the fire is near the community but outside its boundaries, the ministry will pay the fire department to provide the first response (according to the payment scale outlined in the guidelines). In either situation, if the fire is beyond the fire department's capabilities or capacities, Protection Branch is prepared to take control of the fire.

The ministry pays about $20,000 annually under the guidelines to local fire departments that have responded to wildland fires outside their boundaries.

Protection Branch staff feel, and we agree, that the operating guidelines provide an effective mechanism to help define the relationship between the Branch and local firefighters. Before the guidelines, the ministry had to negotiate individual agreements with more than 400 fire departments around the province—a process that was administratively difficult and resulted in inconsistencies. While most local administrative officers and fire chiefs we contacted also felt that the operating guidelines were effective, a few expressed concern over a number of matters, including:

- their liability if they do not have back-up fire services for their protection districts;
- the adequacy of the compensation rates;
- the challenge of acquiring specialized equipment and clothing to fight wildland fires;
- the challenge of providing wildland firefighting training to their structural firefighters; and
- their capacity to provide long-term response to a wildland fire given that most volunteer firefighters have limited availability.

As a result of these concerns, some locations in the province have made the decision to prohibit their fire departments from responding to fires outside their boundaries. This reduces the effectiveness of the joint working relationship between Protection Branch and the local fire departments in these communities.

Significant parts of the province lack protection for structural fires, which means greater risks associated with personal injury and property losses and potentially higher firefighting costs

Protection Branch operating guidelines address situations where local fire departments have been established. However, since communities are not legally required to establish fire departments, many, especially smaller ones, have chosen not to do so. (Residents of these communities are expected to take their own precautions, such as carrying out risk reduction work on their own property and insuring their homes against fire loss.) In unorganized areas where local fire departments do not exist, Protection Branch provides the first response to an interface fire, though its personnel are neither trained nor equipped to deal with structural fires. The result is that, without a local fire department at the ready, there is a greater chance of personal injury, property loss and forest resource loss.

According to a few community officials and Protection Branch representatives, this situation also creates some inequities in who pays for interface fire protection throughout the province. Areas with fire departments are responsible for wildland fires within their boundaries and may be supported by Protection Branch when needed. Areas with no fire departments receive Protection Branch services at no charge.

Ontario handled the matter by banning unprotected areas. The province funded 60 vehicles and six firefighters per vehicle to cover these areas. Initially, the Ontario Fire Marshall was charged with looking after the operation of these resources. With a subsequent change of government, the responsibility devolved to the local governments.

The provincial government is working to have all agencies adopt the British Columbia Emergency Response Management System, to promote consistency of the command structure among all emergency response agencies in the province

Protection Branch and local firefighters are frequently in situations where they are working alongside firefighters from other parts of the province. To ensure their joint fire suppression efforts are done safely and effectively, it is therefore imperative that a familiar command structure be in place.

Most fire departments responding to our survey indicated they have a clearly defined response structure that includes the concept of "incident/unified command" when dealing with interface fires. The 34% who said they did not have this command structure reported that efforts were underway to

adopt it. Although the fire departments and Protection Branch are generally satisfied that the command structure works effectively, 25% of fire chiefs felt that the structure poses some problems when their fire department and the ministry work together on an interface fire.

Because interface fires can easily turn into complex events, many other emergency response agencies—not just local fire departments and Protection Branch—can quickly become involved. The provincial government has long recognized the need for a common command structure and, during the past year, introduced the British Columbia Emergency Response Management System as the provincial standard for incident command purposes. This system is expected to address the command structure concerns that have arisen in past emergencies.

We think that adoption of the Emergency Response Management System is an important step in interface fire response, but we noted a few problems related to it. First, provincial emergency response staffs are mandated to use the system, but emergency responders at the local government level are not. This leaves the possibility of different command systems continuing to exist. Second, although provincial agency employees are being trained in the system, local governments must, for the most part, fund the program themselves. This is slowing its uptake. The Provincial Emergency Program has provided some free training at the municipal level to city administrators and emergency operations centre managers, but there continue to be local concerns about the time it will take to expand training to all those who need it.

Recommendations:

- ***The Ministry of Forests should:***
  - ***Work with local fire departments to address the concerns they have with the Ministry of Forests Operating Guidelines.***
  - ***Work with local fire departments and emergency response staffs in high and moderate interface fire risk areas to improve the application of unified command.***
- ***The Office of the Fire Commissioner should:***
  - ***Work with local fire departments to identify practical solutions to the current impediments to fire department response outside prescribed boundaries.***
  - ***Work with communities to identify practical ways to improve public safety in populated areas of the province that lack fire department services.***

Accessing additional firefighting and emergency response resources

Additional wildland and structural firefighting resources are available to most areas of the province in a timely manner, but access to additional structural fire protection is poor in some areas

Some interface fires have the potential to overwhelm firefighting resources stationed near the affected community, and some fires require specialized crews and equipment. It is neither practical nor cost-effective to have all potential resource needs at the immediate ready. It is reasonable, however, to expect that these resources will be available, when necessary, in a timely manner.

In our opinion, the Ministry of Forests Protection Branch has done a good job of organizing its operations in a manner that allows it to expand and contract its response effort as needed. This helps it provide cost-effective firefighting services. The ministry has divided the province into six fire centres, each of which is further divided into a number of zone offices. This enables the ministry to have its firefighting resources stationed close to potential fires (Exhibit 9). In addition, specialized fire equipment such as air tankers and personnel with specialized training (e.g., in the "rapattack" technique—being lowered into fires from helicopters) are located in centralized locations. This strategic organization of resources, together with the sophisticated information systems in place, helps the ministry ensure that it can deploy its firefighting resources in a cost-effective and timely manner. The ministry also has mutual aid agreements that allow it to call upon firefighting resources from other parts of Canada and the United States when fires overwhelm its own resources. Protection Branch staff we contacted generally agreed that these arrangements work effectively.

Another means of ensuring adequate and timely access to firefighting resources is for fire departments in close proximity to each other to set up mutual aid agreements. About 75% of the fire departments responding to our survey indicated that they have such agreements with nearby fire departments as a means of improving their ability to respond to structure and wildland fires. The other 25% did not have such agreements.

Opting not to enter into mutual aid agreements may reflect a community's distance from other ones or its separation by geographical features such as water bodies. Some smaller communities have so few resources, they feel they cannot commit to helping their neighbours without

Exhibit 9

Ministry of Forests fire centres and zone offices

Coastal Fire Centre (Parksville)
- North Island Fire Zone
- Mid Island Fire Zone
- South Island Fire Zone
- Pemberton Fire Zone
- Sunshine Coast Fire Zone

Northwest Fire Centre (Smithers)
- Dease Lake Fire Zone
- Telkwa Fire Zone
- Burns Lake Fire Zone
- Terrace Fire Zone

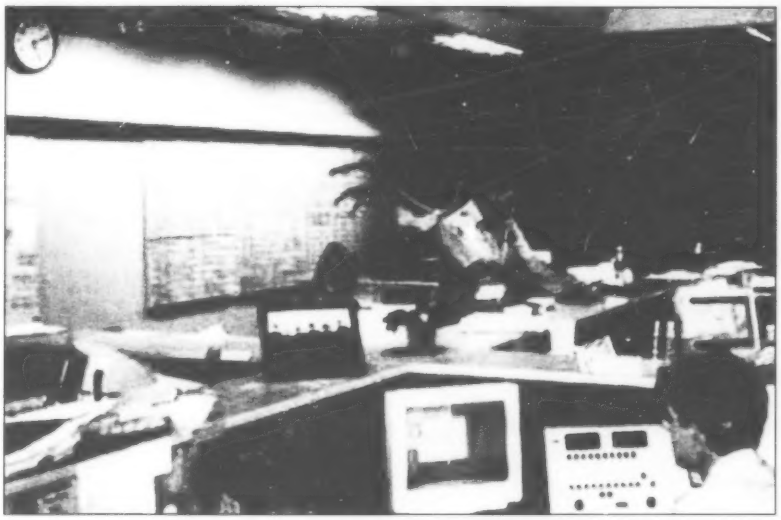
Prince George Fire Centre (Prince George)
- Dawson Creek Fire Zone
- Fort Nelson Fire Zone
- Fort St. John Fire Zone
- Mackenzie Fire Zone
- McBride Fire Zone
- Prince George Fire Zone
- Vanderhoof/Fort St. James Fire Zone

Kamloops Fire Centre (Kamloops)
- Kamloops Fire Zone
- Lillooet Fire Zone
- Merritt Fire Zone
- Penticton Fire Zone
- Salmon Arm Fire Zone
- Vernon Fire Zone
- Clearwater Fire Zone

Southeast Fire Centre (Castlegar)
- Arrow Fire Zone
- Cranbrook Fire Zone
- Kettle Valley Fire Zone
- Invermere Fire Zone
- Kootenay Lake Fire Zone
- North Columbia Fire Zone

Cariboo Fire Centre (Williams Lake)
- Williams Lake Fire Zone
- Chilcotin Fire Zone
- 100 Mile House Fire Zone
- Quesnel Fire Zone

Source: B.C. Ministry of Forests



Courtesy: B.C. Ministry of Forests

Ministry of Forests Fire Control Room utilizes sophisticated systems to deploy firefighting resources

leaving their own community unprotected. Other communities are concerned with liability in offering mutual aid. These fears aside, lack of mutual aid agreements by "at risk" communities clearly expose them to greater chance that their fire protection services may be overwhelmed by a major interface fire striking their community with little warning.

In the case of large and difficult interface fires, the Fire Commissioner is authorized to call upon fire departments in other parts of the province according to predefined working and payment arrangements. For example, the Fire Commissioner used this authority to assist with the Silver Creek Fire near Salmon Arm in 1998. While there were some difficulties during this experience, the Fire Commissioner told us that measures have been taken to address them and he is satisfied that it is an effective mechanism for marshalling additional structural firefighting resources when required.

Recommendation:

- ***The Office of the Fire Commissioner should identify the impediments to mutual aid agreements in some fire departments in the province and recommend practical solutions.***

Planning community emergency response

Fire and emergency response experts generally agree that emergency response planning in many communities does not adequately deal with interface fire issues

There are many other aspects to an interface fire beyond direct fire suppression activities. A community emergency plan can play a vital role in coordinating all the efforts required for site support during a major interface fire. Good plans can help assist fire suppression efforts by allowing firefighters to focus on the fire and not have to deal with all the other issues associated with the event, such as evacuation and crowd control.

The Emergency Program Act requires local authorities to develop emergency plans and be able to enact them. Areas of the province that have not applied for local authority status are exempt from this requirement. To date, 17 of the 27 regional districts in British Columbia have taken steps towards becoming the local authority for some of the electoral areas within each regional district (Exhibit 10). Only a few of these have completed the process and developed emergency plans. The Provincial Emergency Program has investigated amending the Act to require regional districts to have the same emergency responsibilities as local authorities, but to date this has not happened.

Of the emergency program coordinators in high or moderate risk areas who responded to our survey, nearly 75% thought the emergency response plan for their jurisdiction would be effective in an interface fire. About 17% indicated they did not have an effective plan, and the remaining 9% were not sure. In contrast, the Provincial Emergency Program, which has overall responsibility for supporting the development of community-based emergency plans, feels that there are significant concerns around the completeness, currency and adequacy of emergency plans prepared by local authorities. They noted that, while many plans assess risks associated with possible disasters and some cover interface fire, there is an overall lack of consistency in the plans, as well as lack of information about recovery matters. Furthermore, most local government emergency plans do not typically involve First Nations communities in the planning process, although some efforts have been made to include them.

The majority of the fire chiefs responding to our survey felt that their jurisdictions were only somewhat prepared for a significant interface fire, while another one-third thought they were very little prepared. The difference in views by fire chiefs and emergency program coordinators might be explained

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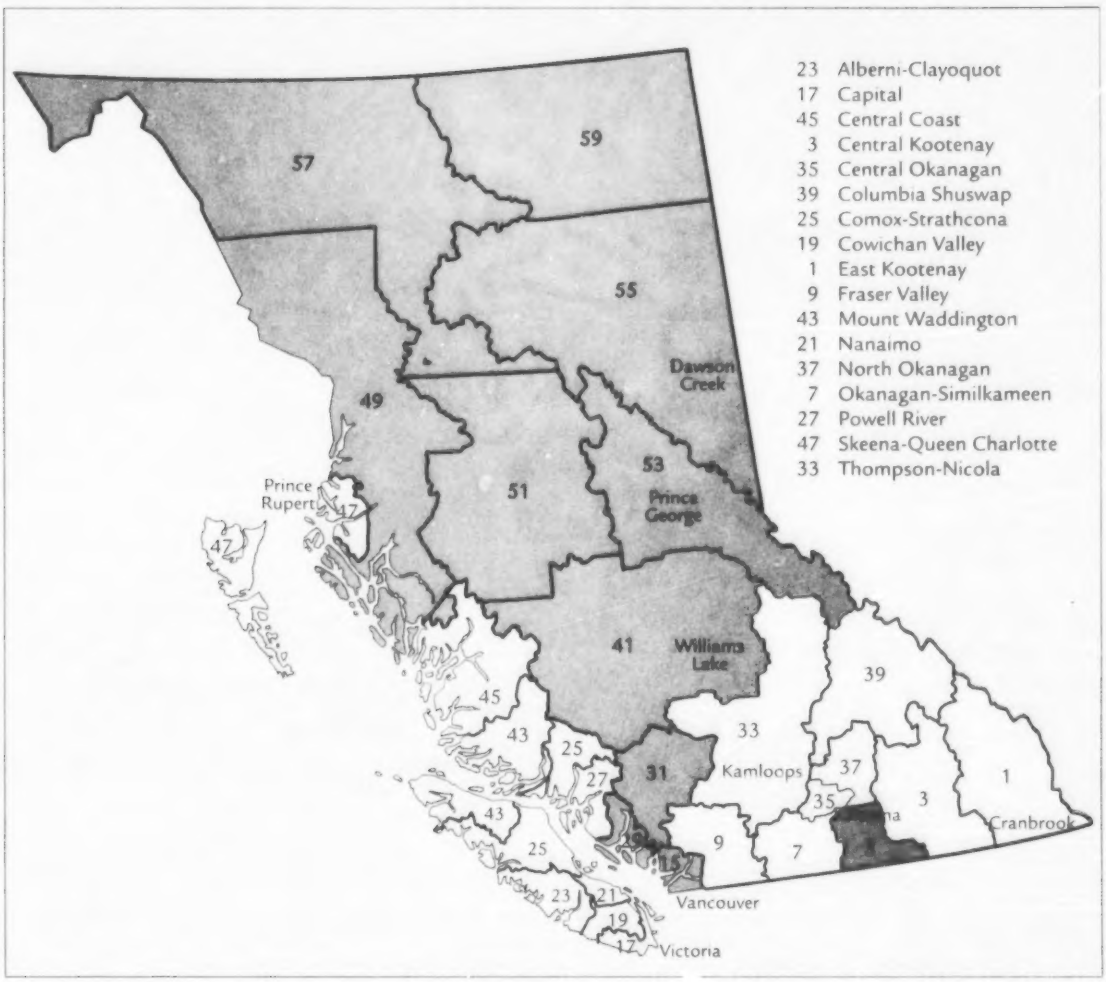
Exhibit 10

Regional districts with local authority status



Source: B.C. Provincial Emergency Program

by the fact that most emergency program coordinators are in part-time positions, so they may lack the experience to make an informed assessment.

Several local officials cited the following as possible causes for poor community emergency planning:

- lack of adequate guidance and standards such as a plan template for preparing plans; and
- lack of a provincial agency to review the plans or take enforcement action when the plans are not adequate.

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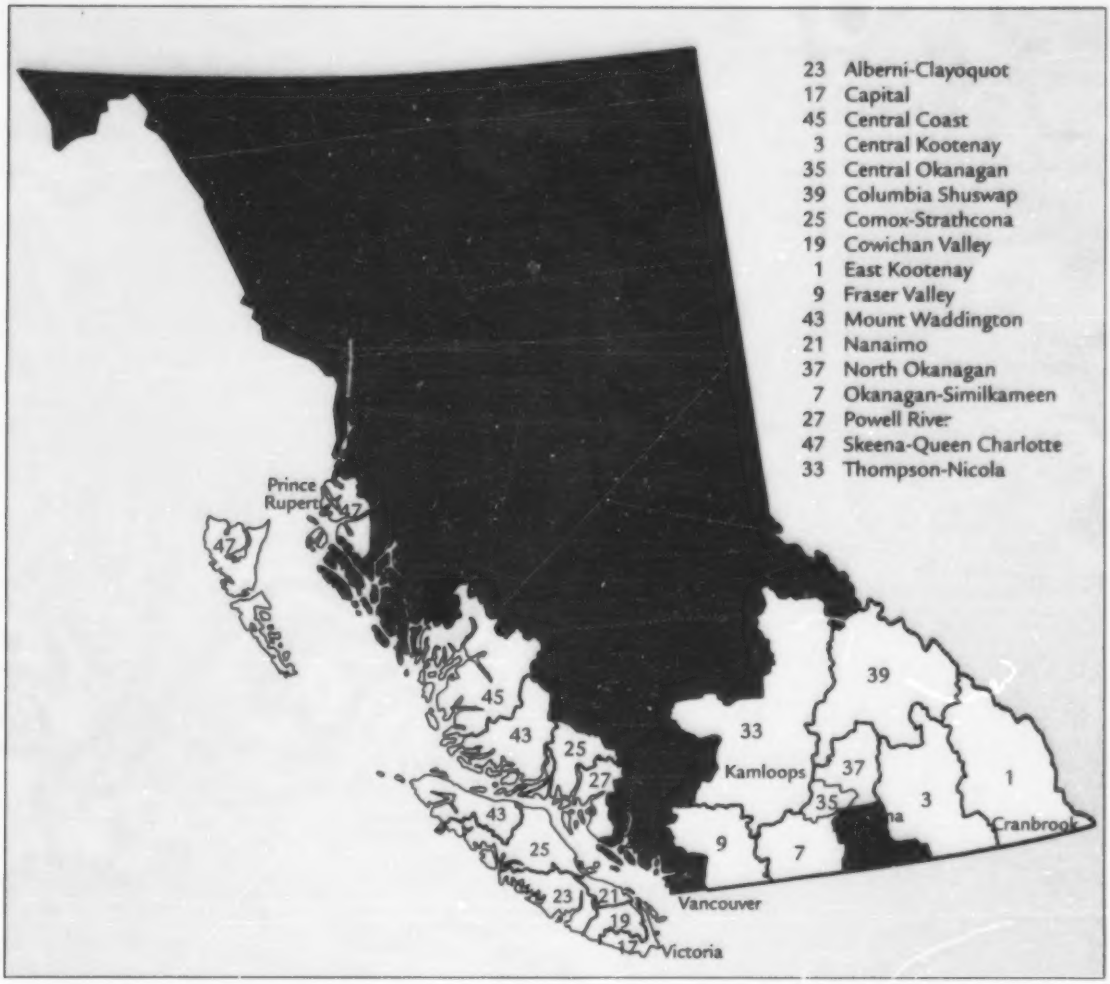

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- lack of a provincial agency to review the plans or take enforcement action when the plans are not adequate.

The Provincial Emergency Program recognizes the problems related to community-based emergency planning, but it feels it does not have the field resources to properly address all the concerns in high and moderate risk communities. Its regional offices are located in Kamloops, Prince George, Terrace, Nelson, Surrey and Victoria. Each office is generally staffed by only a regional manager and an assistant.

Lack of good local emergency planning increases the risk of a poorly coordinated response to and recovery from a major interface fire, and could lead to increased losses and disruption in the affected community.

Recommendations:

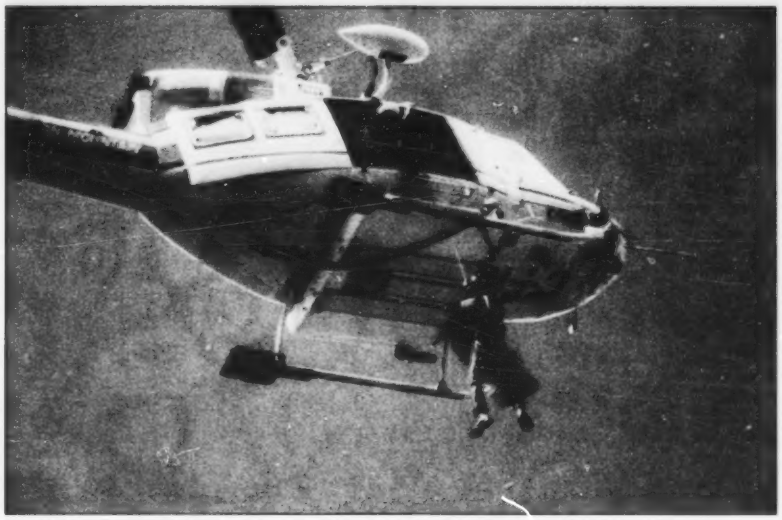
- ***The Provincial Emergency Program should:***
  - ***Encourage all areas of the province with high or moderate interface fire risks to put plans in place to deal with such emergencies, and to develop the ability to enact the plans when needed.***
  - ***Review community emergency plans periodically, giving specific attention to interface fire planning.***
  - ***Finalize development of a formal process for assessing the preparedness level of local authorities and assess each community's level of preparedness on a regular basis.***
  - ***Develop a detailed implementation plan to provide support at the community level where assessments reveal emergency preparedness deficiencies.***

Training firefighters and other emergency responders

Some firefighters and emergency responders in areas with high or moderate interface fire risks are not adequately trained to perform their duties when needed

Training of wildland and structural firefighters and other emergency responders is needed to ensure they can do their jobs safely and effectively during interface fires. We found the Ministry of Forests Protection Branch has a formal training program that it provides to its firefighters. This program includes refresher training at the beginning of each new fire season. Protection Branch staff we contacted felt that, overall, they were adequately trained to perform their roles during an interface fire.

Regular training to fight structural fires is available through the Justice Institute of British Columbia. However, local fire departments are also expected to fight wildland fires inside their boundaries. Protection Branch, in an effort to



Courtesy: B.C. Ministry of Forests

Rapattack firefighters in action

support and assist local communities with preparing to respond to interface fires, has developed courses on this subject that are appropriate for training members of local fire departments. However, we were told by ministry staff it is often difficult to provide such training because of time restrictions. For example, the volunteers in most fire departments also have regular jobs and therefore are not available for training during normal working hours. Providing training after normal working hours or on weekends means that Protection Branch must pay its staff overtime, and ministry budgets make this a challenge.

The result of all this is that training of fire department members in wildland firefighting is not as good as fire chiefs would like it to be. As our survey showed, about 75% of the fire chiefs in areas at high or moderate risk of interface fire felt that their crews were adequately trained to fulfill their role in interface fire situations, but the remaining 23% felt that their crews were not.

The Provincial Emergency Program supports the provision of some emergency training for provincial government and municipal staffs and volunteers. It has a plan in place for training the provincial government emergency responders, but is still in the early stages of assessing the needs of responders at the local level. The program provides some funding for incident command training—specifically for Emergency Operations Centres—and on an "as needed basis" for groups in areas where disaster is imminent (e.g., areas when flooding is a threat). Officials of the program said a limited travel budget hinders their ability to provide training throughout the province.

Recommendations:

- ***The Interface Fire Committee should work with communities to improve training of local firefighters and other emergency responders, with emphasis in high and moderate risk locations.***
- ***The Provincial Emergency Program should:***
  - ***Finalize the training aspects of the British Columbia Emergency Response Management System as quickly as possible and communicate the standard to all local authorities and regional districts.***
  - ***Devise practical ways to speed the delivery of Emergency Response Management System training to fire departments and local emergency response staffs.***

Equipping firefighters and other emergency responders

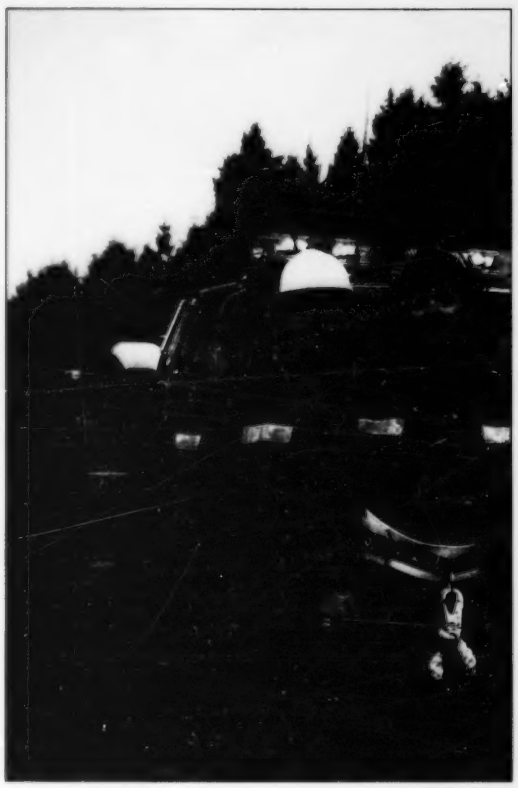
Many fire departments in communities with high or moderate interface fire risks are not adequately equipped to do their work safely and effectively

Response planning includes ensuring that firefighters have the equipment they need to do their jobs safely and effectively. We found that firefighters with the Ministry of Forests Protection Branch were satisfied that they were adequately equipped to do their work in fighting wildland fires. Most firefighters in community fire departments, however—equipped as they are to suppress structure fires—felt that the heavy turnout gear, breathing apparatus and hoses that serve them well in buildings turn into obstacles in the open spaces where wildland fires occur. Similarly, vehicles that work well on city streets are not well suited to wildland areas.

Some fire departments have acquired light-weight protective coveralls, portable water pumps, chain saws, vehicles and related equipment that enable them to be more effective in controlling wildland fires that threaten their communities. Other departments limit their roles to protecting the exterior of structures, using their existing gear and equipment.

Regarding the adequacy of equipment, 72% of fire chiefs in high or moderate risk areas reported that their firefighters had access to the equipment they needed to fulfill their roles in interface fire situations; 25% said they lacked such equipment; 3% were not sure. In some instances, Protection Branch has worked to fill this void (e.g., by loaning equipment or establishing equipment caches in strategic locations). However, this is not done consistently around the province, and in recent years the ministry has found this approach more difficult with

Structural firefighter gear



Wildland firefighter gear

Courtesy: B.C. Ministry of Forests

constrained budgets. For the most part, the ministry and local fire departments have been able to ensure that their firefighting equipment (such as hose connections) is compatible, thereby improving their ability to work together effectively to suppress a wildland fire.

Lack of access to adequate equipment, particularly in high and moderate interface fire risk areas, increases the risk of injury and property losses.

In many areas of the province, firefighters and other emergency responders need to improve their ability to communicate during interface fires

When dealing with interface fires, Protection Branch, local fire departments, neighbouring fire departments, and the Office of the Fire Commissioner (through one of its regional offices located in Victoria, Cranbrook, Kamloops and Prince George) must be able to communicate with each other. Communications is a key element of safe and effective firefighting, yet it is typically cited in many studies as the main problem in coordinating emergency response. In our survey,

only about 46% of the fire chiefs responding said that their radio communications systems were able to access Protection Branch frequencies. About 79% of the fire chiefs said they were able to use their neighbouring fire department frequencies. A nearly equal number (72%) said they had access to the radio frequencies of the Office of the Fire Commissioner.

Where radio communication links exist, it is important they be tested regularly to ensure they work. Nearly three-quarters of fire chiefs surveyed said their radio communication links had been tested within the last year. Collectively, the remaining one-quarter said the links had either not been tested within a year or had never been tested.

According to 87% of the emergency program coordinators responding to our survey, their radio communication systems were compatible with those of other agencies. More than half of the emergency program coordinators noted that the radio communication links had been tested within the last year, but about 20% said the links had never been tested.

The inability of firefighters and other emergency responders to communicate effectively during a major interface fire increases the risk of mistakes occurring, leading to adverse consequences.

Recommendations:

- ***The Interface Fire Committee should identify local fire departments in high and moderate risk locations that lack suitable firefighting and communications equipment, and work with the communities to resolve the deficiencies.***
- ***The Provincial Emergency Program should encourage local fire and emergency response agencies to test radio communications annually and to acquire access to key frequencies.***

Planning to evacuate communities

Fire experts in most jurisdictions feel their communities are poorly prepared to warn residents of dangerous situations or to evacuate them if necessary

Evacuation planning constitutes an important part of emergency response. The presence of residents and other persons in an area threatened by wildfire can inhibit the efforts of fire suppression crews—sometimes with dire consequences. In addition, some wildfires are unpredictable, responding more to wind and weather conditions than to firefighters' attempts at control. In these extreme events, evacuation is the only means of ensuring public safety.

An important element of evacuation is having appropriate means to warn residents of a dangerous wildfire situation in their area. Fire chiefs reported a number of mechanisms are being used to warn residents. Most methods mentioned included door-to-door and personal contact to ensure all residents received the required information. Also noted was the value of using the local news media, either public radio or television, to get the message out. Some respondents suggested the use of a community siren or fire truck sirens, followed by the use of public address or loudspeaker systems.

In addition to being able to warn residents, we believe jurisdictions should have evacuation plans ready for high risk neighbourhoods and locations. Fifty-one percent of the fire chiefs responding to our survey and situated in high or moderate risk areas said their jurisdiction had no evacuation plans for interface fire events in any specific neighbourhood, subdivision or location. About 43% indicated they had such plans; the remaining 6% were not sure. According to the fire chiefs, residents had been made aware of evacuation procedures in only 33% of the jurisdictions.

Community evacuation is a serious measure to take, and so there are limits on who can order one and when. We found that legal procedures for evacuation in British Columbia can be confusing. There are a number of ways to order an evacuation in the province and these vary from hazard to hazard. In wildfire emergencies, the Office of the Fire Commissioner or the British Columbia Forest Service has the authority to do so. Although rarely needed, the local authority may also order an evacuation after declaring a state of local emergency. Where there is no local authority, officials of the Provincial Emergency Program, acting for the Minister of the Attorney General, may order an evacuation after the Lieutenant Governor in Council declares a state of provincial emergency.

Our survey showed some confusion among fire chiefs in high or moderate risk areas over who is responsible for ordering evacuations during interface fires. Many respondents were correct in identifying the entities that can order evacuations: the Office of the Fire Commissioner (29%), local authority (14%), Ministry of Forests (13%), and the Provincial Emergency Program (6%), for areas outside local authority control. However, fire chiefs also identified others with no such authority, including themselves (14%), police (13%) and the local assistants to the Fire Commissioner (6%). These results highlight the need for clarification before emergency events occur, especially in areas of high or moderate interface fire risks.

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It is also important that jurisdictions identify exactly who will carry out an evacuation order during interface fire situations. This might include, for example, the police, search and rescue volunteers, or other agencies carrying the evacuation order to the affected residents. About 66% of the fire chiefs in high or moderate risk areas indicated their jurisdiction had identified the persons or organizations that would carry out an evacuation order in the event of an interface fire; 27% had not designated such agents; the remaining 7% were not sure.

Overall, only about 5% of the responding fire chiefs in areas at high or moderate risk of interface fires said they thought their jurisdiction was very well prepared for evacuation during fire. Forty-eight percent indicated their jurisdiction was somewhat prepared; 32% felt they were very little prepared; 13% said they were not at all prepared for evacuation.

Failing to adequately prepare for community evacuation, particularly in areas with high or moderate interface fire risks, increases the possibility of injury during a major fire.

Stages of Evacuation

Stage 1. Evacuation Alert

The population at risk is alerted of the potential for evacuation, because of the danger of possible loss of life. The Evacuation Alert may allow for the population at risk to begin an orderly preparation to leave the affected area voluntarily, within a specified time, but the reality of the situation may require that immediate action be taken with very short notice.

Note: In some instances, an Evacuation Order is immediate and no Evacuation Alert is given.

Stage 2. Evacuation Order

The population at risk is ordered (by a formal written order) to evacuate the area specified. Once receiving the Evacuation Order, the population at risk must leave the area immediately. A statement must be included in all of the bulletins, pamphlets, warnings and orders making it very clear that while the evacuation is in effect, the area in question will have controlled access, and that an access pass may be required to regain access to the area.

Stage 3. All Clear

The population at risk is allowed to return to the area previously evacuated, having been advised that the danger has passed. There still remains the possibility that the danger may manifest itself again and the Evacuation Order might need to be reissued.

Source: B.C. Interagency Emergency Preparedness Program

It is also important that jurisdictions identify exactly who will carry out an evacuation order during interface fire situations. This might include, for example, the police, search and rescue volunteers, or other agencies carrying the evacuation order to the affected residents. About 66% of the fire chiefs in high or moderate risk areas indicated their jurisdiction had identified the persons or organizations that would carry out an evacuation order in the event of an interface fire; 27% had not designated such agents; the remaining 7% were not sure.

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Source: B.C. Interagency Emergency Preparedness Program

Recommendations:

- ***The Provincial Emergency Program should:***
  - ***Develop clear guidelines on evacuation planning and make them available to community officials.***
  - ***Include an assessment of evacuation planning as part of the proposed overall assessment of the preparedness level of each local authority.***
  - ***Offer training courses on evacuation planning.***
  - ***Develop a strategy for improving the provincial capability to provide emergency warnings and alerts, including conducting a review of current provincial capabilities in this regard and researching best practices.***

Testing the ability to respond to major interface fires

Many communities with high or moderate interface fire risks have not recently exercised their firefighters and other emergency responders using an interface fire scenario

Response planning includes exercising fire department and emergency response staffs in realistic interface fire situations. Jurisdictions that exercise with interface fire scenarios are better prepared to respond when actual events occur. About 35% of fire chiefs who responded to our survey indicated that they had exercised their fire department using an interface fire scenario within the last year; and 28% reported having never done such an exercise. About 23% of the fire chiefs said their fire department had exercised with an interface fire scenario between one and three years ago; the remaining 14% said the last time was more than five years ago.

Only 39% of the emergency program coordinators indicated that their Emergency Operations Centre group participated in some type of formal exercise at least annually. Fifty-five percent said their emergency operations centre did not exercise each year. Only 24% said they had had an interface fire scenario within the last year; and the remaining 7% were not sure.

Interface fire exercises can be more effective when a variety of key response agencies take part. This approach helps test procedures and communications, and allows responders who might interact in an actual event to develop a working rapport. We found that the Ministry of Forests was the most frequently noted organization (22%) participating in interface fire exercises. Three other organizations were cited about

equally: the Provincial Emergency Program, the RCMP and the BC Ambulance Service. Very few fire chiefs (3%) reported that exercises in their jurisdiction involved the Ministry of Transportation and Highways.

Several fire chiefs recommend that the following additional organizations become more involved with interface fire exercises:

- adjacent municipalities
- BC Gas
- BC Hydro
- Canadian Coast Guard
- emergency social service organizations
- local emergency medical volunteers
- local hospital
- B.C. Ministry of Health
- Parks Canada
- regional district
- search and rescue organizations
- tribal police

Most fire chiefs thought the Ministry of Forests Protection Branch was the best suited to organize such exercises. Most emergency program coordinators, however, thought that they themselves should develop interface fire exercises, perhaps in conjunction with the local fire service, Protection Branch and the Provincial Emergency Program.

Inadequate testing of a community's emergency response systems may hamper its ability to effectively respond to a major interface fire event.

To date, most interface fires have been responded to without major incident

Response planning is put to the test when an actual interface fire situation occurs. At that point, response planning measures are implemented with the expectation that poor decisions, resulting in costly operational mistakes or unsafe practices, will be avoided. Although it was not a primary objective of our audit, we did gather some information about the effectiveness of response planning during interface fire situations.

In our survey, 45% of the fire chiefs in high or moderate risk areas reported having had a significant interface fire in their jurisdiction within the last 10 years. Fifty-one percent reported no such fires, and 4% were not sure.

Courtesy: B.C. Ministry of Forests

A community carries out a test of its emergency response systems

According to almost half of fire chiefs who responded, the local fire department, Ministry of Forests Protection Branch firefighters, and local emergency responders had worked together effectively to deal with a specific fire. Only 3% said these groups did not work together effectively and 9% were not sure. As many as 43% of the fire chiefs said the question did not apply to them (perhaps because the local fire department did not work with Protection Branch or the local emergency responders).

The vast majority of the fire chiefs (72%) also reported that they had never had to be involved with other agencies during an evacuation of their community as a result of an interface fire. This finding suggests that evacuations were not required in the fire events they had in mind, or that evacuations did not involve more than one agency. Only 19% of the fire chiefs said that, for a particular situation, the responsible agencies had worked together effectively during evacuations, and 3% said that the agencies had not done so.

Given that many fire chiefs and emergency program coordinators have had no direct experience with interface fires, we concluded that they might find the experience of others beneficial.

Overall, many fire chiefs in high or moderate risk areas consider their communities to be poorly prepared for a significant interface fire

When asked about the overall level of preparedness of their communities to respond to an interface fire, only about 6% of fire chiefs in high or moderate risk locations said they thought their jurisdiction was very well prepared. This contrasts with the perception of preparedness held by chief administrative officers—37% of whom felt their jurisdiction was very well prepared.

A little more than half of the fire chiefs thought their jurisdiction was somewhat prepared for interface fire, and another third considered themselves to be very little prepared. Six percent said their jurisdiction was not prepared at all.

Recommendations:

- ***The Provincial Emergency Program should:***
  - ***Develop a program to guide local fire departments and emergency responders in developing realistic scenarios for interface fire exercises.***
  - ***Encourage provincial communities to conduct interface fire exercises.***
  - ***Encourage its own representatives, key provincial response agencies and other affected provincial and local agencies to participate, whenever possible, in interface fire exercises conducted by communities.***
  - ***Actively support local communities in the design, conduct and evaluation interface fire exercises,***
  - ***Maintain a database of lessons learned and best practices.***
  - ***Develop an annual exercise schedule and encourage communities to follow it.***

Recovering from major interface fires

Many communities do not adequately address recovery planning matters

In addition to response planning, another way to reduce losses from an interface fire is to speed the recovery of the community and help residents return to normal. Recovery planning includes the physical restoration and reconstruction of a community following a major fire. Actions may include re-introducing displaced persons to the area, carrying out economic impact studies, offering counselling, setting up financial assistance programs, creating temporary housing, and distributing health and safety information.

The provincial Emergency Program Act requires local authorities to include preparation for recovery in their planning process, yet 47% of the emergency program coordinators who responded to our survey indicated their jurisdiction had no recovery plan. And 83% also noted that their emergency response plan does not include an organizational structure for recovery from interface fire. This same group reported that their response plans do address the following: the return of residents and animals to the community (23%); rebuilding of the community (14%); property claims procedures (11%); and site rehabilitation (4%). These results are consistent with the Provincial Emergency Program's observation that most community emergency plans lack information about recovery matters.

Experience with the implementation of recovery plans is also limited in the province. Most of the fire chiefs we contacted said that recovery was not a matter addressed in the interface fires they had experienced. Only 17% described the community recovery process as effective; 7% were not sure.

Recommendations:

- ***The Provincial Emergency Program should:***
  - ***Develop guidelines and examples of recovery planning and make this material available to provincial communities.***
  - ***Include an assessment of recovery planning as part of the proposed overall assessment of the preparedness level of each local authority.***

gathering and reporting information

Government managers require complete and reliable information about interface fires in the province to help them manage the risks. We expected to find that provincial and local governments are collecting information about the nature and extent of interface fires in British Columbia and about efforts made to manage the risks. We also expected to find that pertinent information is reported to stakeholders about the risks associated with this hazard and the progress made to manage them.

Conclusion

We concluded that the information collected by the government agencies involved with the interface fire issue is neither complete nor accurate enough to help manage the associated risks. The matters requiring attention include:

- developing a clear definition of interface fire as a basis for understanding and assessing interface fire risks in the province;
- better defining what information should be gathered—not only on actual interface fires, but also on the potential for such fires, the efforts made to prevent them and the efforts made to prepare to respond to and recover from them;
- determining how the information can best be gathered;
- deciding how the information should be analyzed; and
- deciding who would benefit from receiving the information.

Given the lack of complete and reliable information about interface fire risks, it is understandable that, to date, little information has been reported about the risks and the progress made to manage them.

Findings

We looked at the adequacy of the following types of information that is needed to manage the risk of interface fire in the province:

- information about the incidence of interface fires that have occurred in the province and about the costs and losses associated with them;

- information about what areas of the province are at high or moderate risk of experiencing this type of fire, what measures are being used to prevent the fires or mitigate their effects if they occur, and what has been done to prepare to respond to and recover from the fires; and
- reporting on the management of interface fire risks.

Gathering information about fire incidence, costs and losses

Because the term "interface fire" is not clearly defined, there is no way to produce a reliable estimate of the magnitude of the problem

Local and provincial government representatives define interface fire generally as a wildfire that occurs in or near an urban area. However, those same individuals do not agree on a formal definition, one that would allow a reliable count of these fires to be made. For example, according to some agency representatives, an interface fire is a wildfire that affects a single structure. Others say that an interface fire must involve more than one structure. Some include fires that merely have the potential to affect a community or structure; others require that more than the mere threat of damage must exist before a wildfire can be classed as an interface fire.

Without agreement on a definition with enough rigour to distinguish interface fires from purely structural or wildland fires, the number of interface fires in British Columbia and the extent of their threat remain impossible to measure with confidence. This hampers general understanding of the issue and the level of attention it receives.

Information gathered about interface fires is not assembled to provide a provincial perspective on the extent of the problem and the costs and losses associated with these events

We found that Protection Branch prepares reports on all fires its staff attends and keeps statistics on their incidence, cause, losses and other features. To avoid double counting, the Branch excludes from its statistics any fires within a local government's boundaries when a local fire department also attends. The Office of the Fire Commissioner asks fire departments to submit reports on all fires they attend if there are deaths, injuries or dollar losses associated with the fire. The result of this process is a 60-page annual report of collective fire losses in British Columbia for the year. However, there is no requirement for the fires to be identified as interface when

Courtesy: B.C. Ministry of Forests

An interface fire scene

they are reported to the Fire Commissioner, even though more than two-thirds of fire chiefs responding to our survey said they keep some records of interface fires in their area. As a result, important data that would help reveal the provincial extent of the interface fire problem are not assembled, even though they are available.

We believe that if the focus of reporting to the Office of the Fire Commissioner were expanded to include all interface fires attended by local fire departments (regardless of the existence of a dollar loss), and if the information from Protection Branch on interface fires were consolidated with it, then a complete and reliable source of interface fire activity in the province would be established.

In addition to collecting information on the extent of the problem, knowing the cost of preparing for and responding to interface fires is also important. Protection Branch collects information on its preparedness and response costs for all wildfires (Exhibit 5), but does not separate out the costs related specifically to interface fires. As well, no information is collected from local fire departments on their costs to prepare for and attend interface fires. By not assembling such data, the provincial government is missing a chance to gain a provincial perspective on the costs associated with preparing for and responding to interface fires.

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Enhanced Information on Fire Loss Statistics

At the recent annual conference of the Council of Canadian Fire Marshals and Fire Commissioners, the matter of harmonizing fire loss statistics was discussed. Currently, such statistics can vary between jurisdictions, making comparisons difficult. The proposed formula for harmonizing figures would provide not only loss information, but also total value of property saved:

Total value reported at risk (structure and contents)
- Loss reported
= Value saved
+ Business interruption saved
= Total value saved

In addition to measuring for interface firefighting success, this formula could be modified to measure the success of mitigation activities such as use of fire-resistant roofing and siding materials or the creation of defensible space.

Gathering information about fire risks and how those risks are managed

Significant gaps exist in the information about areas with high or moderate interface fire risks, and about the adequacy of measures taken to manage those risks

Throughout this report, we have used the emergency management model to assess how well governments in the province are managing the risk of interface fires. Our findings indicate that the different agencies involved have made many efforts to:

- raise awareness;
- identify and assess the risks throughout the province;
- develop and implement measures to mitigate the risks;
- prepare to respond to interface fires; and
- plan for recovery of communities following a significant interface fire.

Evidence, however, also points to many gaps in the management of the risks, frequently in areas known to be at high or moderate risk of interface fires. We believe that such gaps should be reported routinely to stakeholders so that corrective actions can be taken in a timely manner.

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Evidence, however, also points to many gaps in the management of the risks, frequently in areas known to be at high or moderate risk of interface fires. We believe that such gaps should be reported routinely to stakeholders so that corrective actions can be taken in a timely manner.

In our opinion, a major reason for the lack of good information is that, because responsibility for this issue rests with so many agencies, information tends to be scattered among them. No single agency assembles, reviews and interprets the data to provide a provincial perspective of the issue and assess how well the risks are being managed.

Reporting on the management of interface fire risks

Performance information on the management of interface fire risks in the province is not reported regularly

Provincial and local governments in British Columbia provide programs and services to their constituents through the budget allocation process. To make good decisions on where resources are needed and how they can best be spent, governments need information on how well existing programs are meeting the needs of citizens and, if the programs are deficient, what changes are needed.

We found that there is no regular reporting about interface fire risks in the province or about government programs that help manage those risks. No provincial estimate of private property damage is reported, or of injury to or loss of human life caused by interface fires. Neither the Ministry of Forests' annual report nor the Office of the Fire Commissioner's annual report on fire losses in British Columbia contains any specific information related to interface fires or to the costs associated with prevention, preparedness and recovery planning activities.

Furthermore, governments have received little information on the risk of catastrophic interface fires—events that have been predicted by Ministry of Forests Protection Branch staff and echoed by local fire departments and local governments in moderate and high risk areas of the province.

Also of concern to us is the lack of adequate information being provided to the public and Legislature about how well governments in British Columbia are managing interface fire risks.

Recommendation:

- ***The Interface Fire Committee should gather complete and reliable information about the nature and extent of the interface fire issue in the province and use the information to report on the management of the risks in communities with high or moderate risk associated with this hazard.***

In formulating such a strategy, the committee should consider:

- *Developing a formal definition of the term "interface fire."*
- *Agreeing on a formal process to assess the level of risk present in communities (i.e., high, moderate or low).*
- *Defining the information that should be collected, such as the number of fires occurring each year, the location of each fire, and the costs and losses associated with each event.*
- *Developing a mechanism by which the information can be regularly gathered and periodically reported.*

ministries response

The report accurately identifies the separation of responsibilities between local governments and the province. The Local Government Act delegates considerable autonomy to local governments with respect to the provision of services and, as such, makes the coordination and sharing of interface fire preparedness and response initiatives challenging.

Fire suppression is a discretionary service of local governments and the level of that service is a function of the council's willingness and ability to pay. Many communities do not have the resource tax base that enabled them to allocate the necessary funds to fire protection or emergency preparedness to the extent anticipated by the province.

There is no provincial agency with overall authority for dealing with all aspects of interface fires, nor is their currently a mechanism for ensuring participation by local governments. We concur with the report's findings that managing the interface fire issues is contingent on a strong partnership and resource sharing among all levels of government.

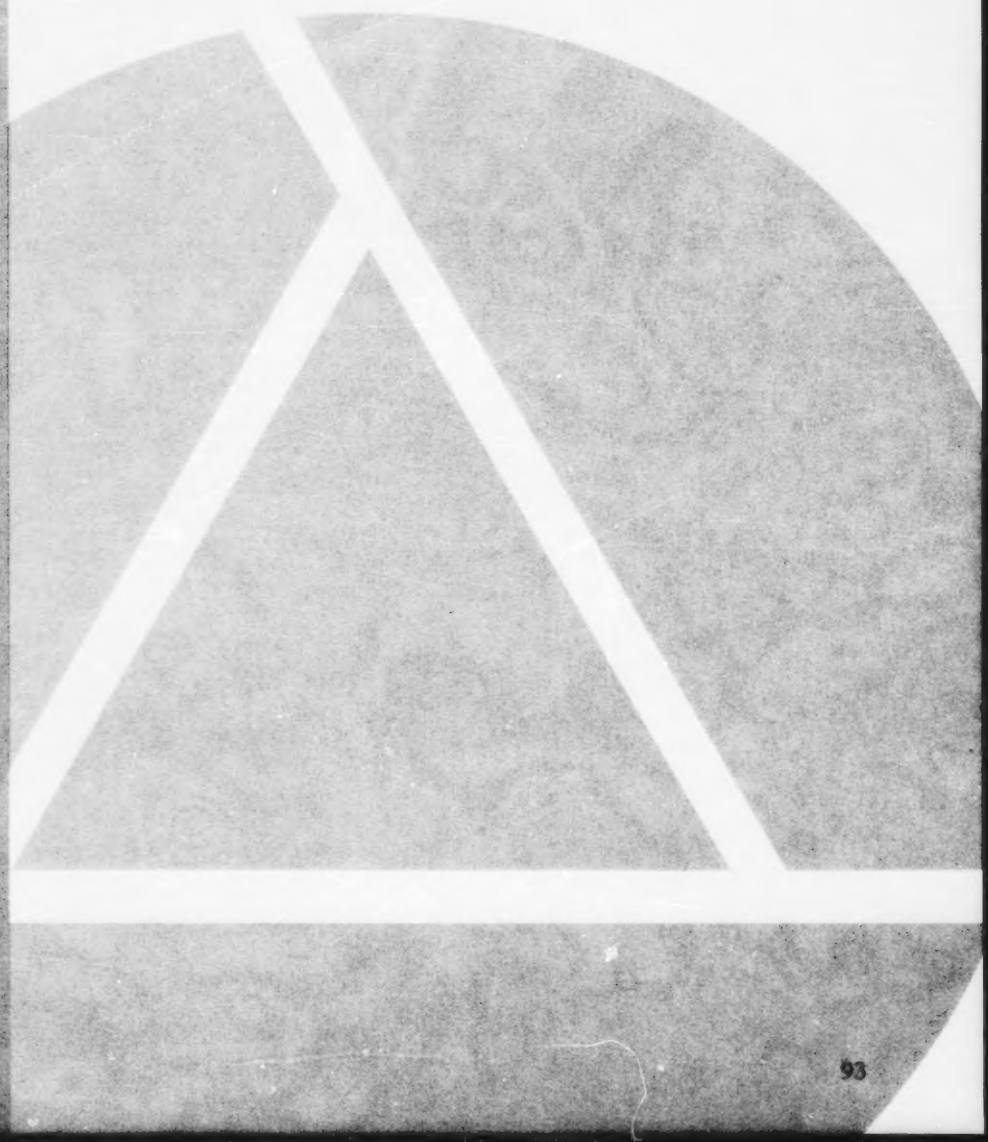
While it is clear that the provincial capability to manage interface fire risk can be improved, our ministries have made, and continue to make, progress in reducing the risk. The information in the report will form the basis for discussion and development of a coordinated approach and long-term strategy to manage interface fire risks within the province.

The 2001 fire season is fast approaching and the preliminary indications are for a drier than normal and more severe summer period. Planning is well under way to address this potential threat. Our ministries are committed to addressing your recommendations in detail and to initiating a dedicated implementation plan.; however, it would not be prudent to commit to a specified timeline with the pending fire season upon us. We will commit, however, to providing you with a detailed action plan before the end of this year.

Thank you for your report. We collectively look forward to improving the government's capability to manage interface fire risks in British Columbia.

Ministry of Attorney General
Ministry of Forests
Ministry of Municipal Affairs

glossary of terms



glossary of terms

Defensible space

The distance between a structure and the wildland vegetation, a relatively fuel-free zone in which firefighters can stage their attack to stop structure fires from spreading to the surrounding wildland vegetation or prevent wildland fires from spreading to the structure.

Forest fuel

Plant life such as trees, shrubbery, grasses and other covers that provide the combustible material needed for a fire to burn in the forest.

Hazard assessment

An assessment of wildfire hazard made by evaluating building and adjacent site characteristics, including building materials used, amount of defensible space, surrounding topography and types of vegetation.

Hazard mapping

A process to identify the degree of wildfire hazard in a community—in map format—that correlates physical land characteristics (including slope and fuel type), the hazard assessment of individual residential lots, and information on access and water supply within the community.

Infrastructure

The network of roadways, open spaces, water supply, signage and utilities that increases resident and firefighter safety and facilitates quick response by firefighters.

Interagency committee

A regional committee including representatives from all agencies interested in managing the risks of interface fire. Goals of the committee may include raising awareness of interface fire issues and solutions among committee members, recommending future changes to Regional District and municipal bylaws to improve the protection of interface communities from catastrophic wildfire, and staging interface fire simulations to test emergency response agency preparedness and raise awareness within the community.

Interface

Also known as the "wildland-urban interface." Occurs wherever residential, industrial or agricultural developments are located within or near wildland settings with natural vegetation.

Interface fire

A fire that has the potential to involve buildings and wildland fuels or vegetation simultaneously.

Legal mechanisms

Local government bylaws and restrictive covenants aimed at reducing interface fire risks.

Local authority

For a municipality, this is the municipal council; for an electoral area in a regional district it is the board of the regional district if the regional district has been granted the powers of a municipality under the Local Government Act.

Local governments

The governing bodies of cities, districts, regional districts, municipalities, towns and villages.

Mitigation

Solutions to reduce the hazard posed by interface fire to communities or homes, including vegetation management, structural options and infrastructure.

Organized area

An area where residents have a local level of government and usually a fire department.

Risk

The potential for loss, referring to the probability of an event that causes damage, injury or other type of adverse consequence. May also be referred to as hazard.

Structural fire

A fire in a constructed unit such as a building.

Topography

The lay of the land, including the steepness of the slope, the direction it is facing, and terrain features such as ravines or gullies.

Unorganized area

A residential area that is rural in nature and not administered by a local level of government.

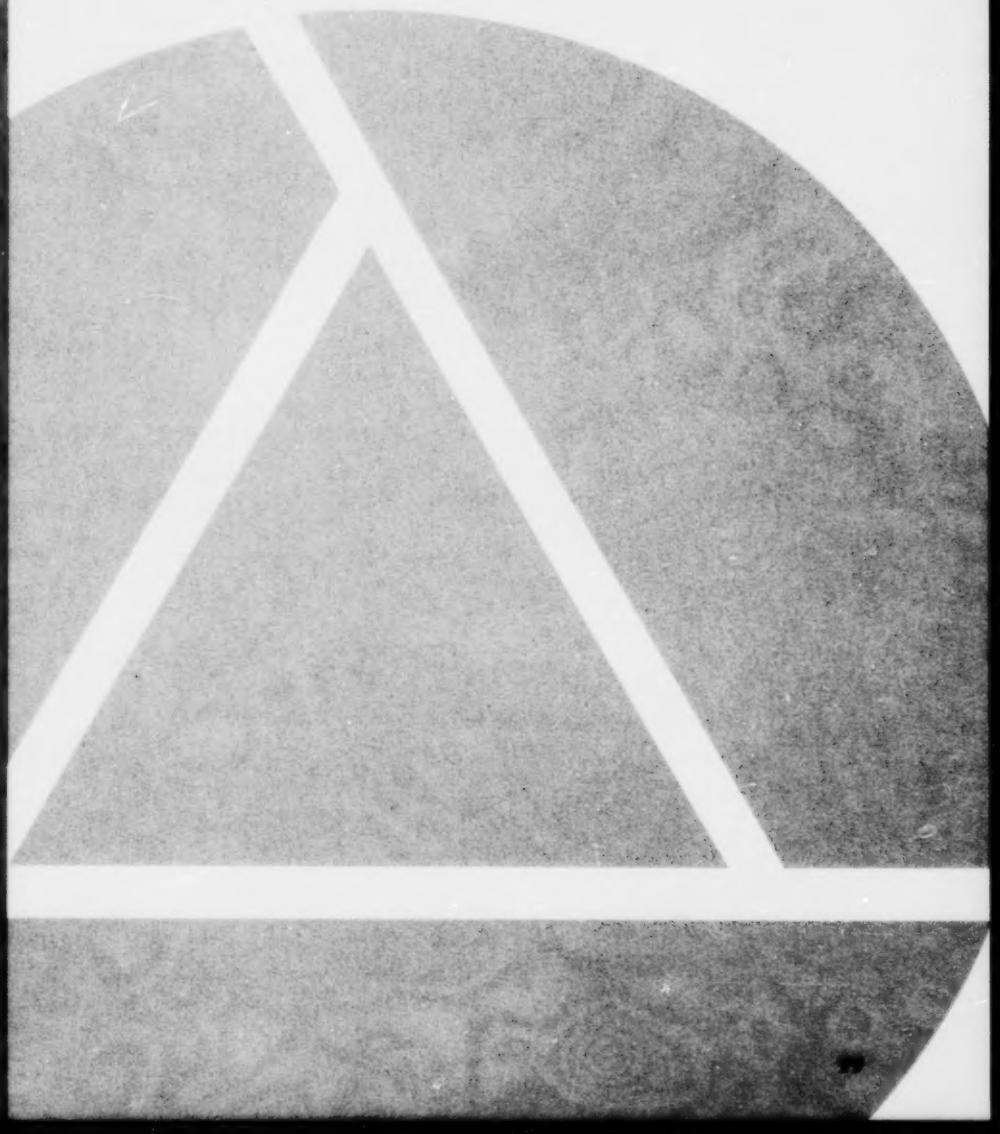
Wildfire

A destructive or uncontrollable fire that spreads with great speed and involves flammable vegetation such as trees, bushes and grasses.

Wildland

Undeveloped land in its natural state, often vegetated with trees, bushes and grasses.

appendices



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appendix a

Survey Response Summary

In the spring of 2000, we sent surveys to all local governments throughout the province to determine how they managed fire risks in the wildland-urban interface. We developed four surveys, each one targeted to a specific group: fire chiefs, chief administrative officers, emergency program coordinators, and development/planning directors. The surveys sought to assess the level of preparedness among local governments for major interface fires.

Preliminary estimates put the number of individuals making up all those groups in the province at 943. This total includes individuals in a number of fire districts and fire response organizations identified by the Office of the Fire Commissioner. We therefore sent out 943 surveys.

During our survey follow-up, however, we found that our estimate of 943 potential participants had been high. Two factors limited the actual number of potential participants. First, a number of the presumed positions at the local and regional levels do not exist or are not filled. The position of emergency program coordinator, for example, is currently vacant in some municipalities, and about half of the regional districts in the province are not required to have such a position. Second, some participants serve in more than one position, yet completed only one survey form. As a result, the number of actual potential participants in the survey was lower than we originally estimated, which means the response rate was higher than is shown in Exhibit A1.

The number of responses we received and the overall response rate for each group are shown in Exhibit A1.

Exhibit A1

Survey response rates by participant group

	Fire Chiefs	Emergency Program Coordinators	Development /Planning Directors	Chief Administrative Officers	Total
Number of surveys sent	411	170	181	181	943
Number of responses received	176	53	70	87	386
Response rate	43%	31%	39%	48%	41%

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Response rate	43%	31%	39%	48%	41%

The assessment of returned surveys also identified the type of community the respondent represented—specifically, a regional district, city, district municipality, village or town. Exhibit A2 summarizes the responses received by community type.

When viewed from the perspective of incorporated communities, the response rate is much higher (81%) than by individuals (41%). Again, we suspect it would be higher still, given that—as our follow-up calls revealed—in some municipalities, representatives among the four participant groups shared their information and submitted just one completed survey for the community. Also, in many jurisdictions, the chief administrative officer or emergency program coordinator submitted a completed survey where the fire chief did not.

In addition to responses from 146 regional districts, cities and other incorporated jurisdictions, we also received responses from 93 fire protection organizations, mostly volunteer fire departments in unincorporated areas of the province. Based on an estimate of about 250 such organizations, we calculated the response rate for fire chiefs in volunteer departments to be about 36%.

Exhibit A3 lists the regional districts and municipalities represented in the survey results. Communities are listed alphabetically under their respective regional districts. Although most regional districts are listed, only 16 of the 28 regional districts responded to the survey.

The exhibit also indicates the type of municipality for each community, and displays the 1999 population estimated by B.C. Stats. The results represent communities with a combined population of at least 2,418,729, about 60% of the total provincial population of 4,029,253. This does not include the unknown populations contained within unincorporated areas and represented by the 93 responding fire protection districts.

Exhibit A2

Survey response rates by community type

	Regional Districts	Cities	Districts	Villages	Towns	Total
Survey form sent to:	28	44	54	40	15	181
Responses received from:	16	40	51	27	12	146
Response rate	57%	91%	94%	68%	80%	81%

The column with the heading "Fire Risk" identifies those jurisdictions with interface fire risk ranked at either a high or moderate level by at least one respondent, most often the fire chief of the jurisdiction. Among the high or moderate risk communities, the survey responses account for a total of 1,368,603 residents, about 34% of the provincial population.

The municipality types listed in Exhibit A3 include:

- City (C)
- District Municipality (DM)
- Village (VL)
- Town (T)

Exhibit A3

Communities represented in survey results

Regional District Municipality	Municipality Type	Population 1999	Fire Risk * High/Moderate
Alberni-Clayoquot			
Port Alberni	C	19,334	*
Tofino	DM	1,479	
Ucluelet	DM	1,764	
Bulkley-Nechako			
Burns Lake	VL	1,888	*
Fort St. James	DM	2,111	*
Fraser Lake	VL	1,283	*
Granisle	VL	456	*
Houston	DM	4,232	*
Smithers	T	6,069	*
Vanderhoof	DM	4,777	*
Capital			
Central Saanich	DM	15,509	*
Colwood	C	14,676	*
Esquimalt	DM	16,423	
Highlands	DM	1,602	*
Langford	DM	19,567	*
Metchosin	DM	5,030	*
North Saanich	DM	10,918	*
Oak Bay	DM	17,900	
Saanich	DM	106,695	*
Sidney	T	11,202	

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Fraser Lake	VL	1,283	*
Granisle	VL	458	*
Houston	DM	4,232	*
Smithers	T	6,069	*
Vanderhoof	DM	4,777	*
Capital			
Central Saanich	DM	15,509	*
Colwood	C	14,678	*
Esquimalt	DM	16,423	
Highlands	DM	1,682	*
Langford	DM	19,567	*
Metchosin	DM	5,030	*
North Saanich	DM	10,918	*
Oak Bay	DM	17,900	
Saanich	DM	106,695	*
Sidney	T	11,282	

... continued

Regional District Municipality	Municipality Type	Population 1999	Fire Risk * High/Moderate
Sooke	DM	9,280	*
Victoria	C	75,283	
View Royal	T	7,325	*
Cariboo			
Quesnel	C	10,589	*
Wells	DM	258	*
Williams Lake	C	11,917	*
100 Mile House	DM	2,046	*
Central Kootenay			
Castlegar	C	7,393	*
Creston	T	5,089	*
Kaslo	VL	1,106	*
Nakusp	VL	1,788	*
New Denver	VL	612	*
Salmo	VL	1,256	*
Silverton	VL	240	*
Central Okanagan			
Kelowna	C	97,385	*
Peachland	DM	4,833	*
Columbia-Shuswap			
Golden	T	4,193	*
Revelstoke	C	8,226	*
Salmon Arm	DM	16,285	*
Comox-Strathcona			
Campbell River	DM	31,295	
Comox	T	12,153	*
Courtenay	C	19,511	*
Cumberland	VL	2,726	*
Gold River	VL	1,800	*
Sayward	VL	432	*
Tahsis	VL	885	*
Cowichan Valley			
Duncan	C	4,781	*
Ladysmith	T	6,878	*
Lake Cowichan	T	3,064	*
North Cowichan	DM	27,346	*
East Kootenay			
Cranbrook	C	19,797	*
Elkford	DM	2,805	*
Fernie	C	5,203	*

. . . continued

Regional District Municipality	Municipality Type	Population 1999	Fire Risk * High/Moderate
Invermere	DM	2,947	*
Kimberley	C	6,916	*
Radium Hot Springs	VL	605	*
Sparwood	DM	4,163	*
Fraser Valley			
Abbotsford	C	114,216	
Chilliwack	C	65,263	
Hope	DM	6,826	*
Kent	DM	5,316	*
Mission	DM	32,660	*
Fraser-Fort George			
Mackenzie	DM	6,250	*
McBride	VL	757	*
Prince George	C	80,845	*
Valemount	VL	1,362	*
Greater Vancouver			
Belcarra	VL	707	*
Bowen Island	DM	3,000 (est)	*
Burnaby	C	190,272	*
Coquitlam	C	111,534	*
Delta	DM	101,098	*
Langley	C	24,178	
Langley	DM	88,489	
Maple Ridge	DM	61,970	
New Westminster	C	54,177	
North Vancouver	C	44,640	*
North Vancouver	DM	85,509	*
Pitt Meadows	DM	14,756	*
Port Coquitlam	C	51,130	*
Port Moody	C	23,736	*
Richmond	C	164,009	
Surrey	C	336,034	*
Vancouver	C	558,232	
West Vancouver	DM	42,541	*
White Rock	C	17,573	
Kitimat-Stikine			
Hazelton	VL	367	
Kitimat	DM	11,672	*
New Hazelton	DM	836	
Stewart	DM	702	*
Terrace	C	13,836	

. . . continued

Regional District Municipality	Municipality Type	Population 1999	Fire Risk * High/Moderate
Kootenay-Boundary			
Fruitvale	VL	2,153	*
Greenwood	C	761	
Midway	VL	686	*
Montrose	VL	1,169	*
Trail	C	7,626	
Mount Waddington			
Port Alice	VL	1,293	
Nanaimo			
Nanaimo	C	76,173	*
Parksville	C	10,358	*
Qualicum Beach	T	7,390	*
North Okanagan			
Armstrong	C	4,216	*
Coldstream	DM	9,551	
Spallumcheen	DM	5,688	*
Vernon	C	34,227	*
Northern Rockies			
Fort Nelson	T	4,777	*
Okanagan-Similkameen			
Keremeos	VL	1,190	*
Penticton	C	32,627	*
Princeton	T	2,981	*
Summerland	DM	10,856	*
Peace River			
Chetwynd	DM	3,059	*
Dawson Creek	C	11,812	
Fort St. John	C	16,448	
Hudson's Hope	DM	1,152	*
Pouce Coupe	VL	928	*
Taylor	DM	1,211	
Tumbler Ridge	DM	2,858	*
Powell River			
Powell River	DM	13,900	*

. . . continued

Regional District Municipality	Municipality Type	Population 1999	Fire Risk * High/Moderate
Skeena-Queen Charlotte			
Port Edward	DM	772	
Prince Rupert	C	16,985	
Squamish-Lillooet			
Lillooet	DM	2,971	*
Squamish	DM	15,359	*
Whistler	DM	9,430	*
Sunshine Coast			
Gibsons	T	3,885	*
Sechelt	DM	8,387	*
Thompson-Nicola			
Ashcroft	VL	1,974	*
Clinton	VL	737	*
Kamloops	C	81,958	*
Logan Lake	DM	2,516	*
Lytton	VL	320	*
Merritt	C	8,054	*

appendix b

Office of the Auditor General: Performance Auditing Objectives and Methodology

Audit work performed by the Office of the Auditor General falls into three broad categories:

- Financial auditing;
- Performance auditing; and
- Conduct of business auditing.

Each of these categories has certain objectives that are expected to be achieved, and each employs a particular methodology to reach those objectives. The following is a brief outline of the objectives and methodology applied by the Office for performance auditing.

Performance Auditing

What are Performance Audits?

Performance audits (also known as value-for-money audits) examine whether money is being spent wisely by government —whether value is received for the money spent. Specifically, they look at the organizational and program elements of government performance, whether government is achieving something that needs doing at a reasonable cost, and consider whether government managers are:

- making the best use of public funds; and
- adequately accounting for the prudent and effective management of the resources entrusted to them.

The aim of these audits is to provide the Legislature with independent assessments about whether government programs are implemented and administered economically, efficiently and effectively, and whether Members of the Legislative Assembly and the public are being provided with fair, reliable accountability information with respect to organizational and program performance.

In completing these audits, we collect and analyze information about how resources are managed; that is, how they are acquired and how they are used. We also assess whether legislators and the public have been given an adequate explanation of what has been accomplished with the resources provided to government managers.

Focus of Our Work

A performance audit has been described as:

...the independent, objective assessment of the fairness of management's representations on organizational and program performance, or the assessment of management performance,

against criteria, reported to a governing body or others with similar responsibilities.

This definition recognizes that there are two forms of reporting used in performance auditing. The first—referred to as attestation reporting—is the provision of audit opinions as to the fairness of management's publicly reported accountability information on matters of economy, efficiency and effectiveness. This approach has been used to a very limited degree in British Columbia because the organizations we audit do not yet provide comprehensive accountability reports on their organizational and program performance.

We believe that government reporting along with independent audit is the best way of meeting accountability responsibilities. Consequently, we have been encouraging the use of this model in the British Columbia public sector, and will apply it where comprehensive accountability information on performance is made available by management.

As the performance audits conducted in British Columbia use the second form of reporting—direct reporting—the description that follows explains that model.

Our "direct reporting" performance audits are not designed to question whether government policies are appropriate and effective (that is achieve their intended outcomes). Rather, as directed by the Auditor General Act, these audits assess whether the programs implemented to achieve government policies are being administered economically and efficiently. They also evaluate whether Members of the Legislative Assembly and the public are being provided with appropriate accountability information about government programs.

When undertaking performance audits, we look for information about results to determine whether government organizations and programs actually provide value for money. If they do not, or if we are unable to assess results directly, we then examine management's processes to determine what problems exist or whether the processes are capable of ensuring that value is received for money spent.

Selecting Audits

All of government, including Crown corporations and other government organizations, are included in the universe we consider when selecting audits. We also may undertake reviews of provincial participation in organizations outside of government if they carry on significant government programs and receive substantial provincial funding.

When selecting the audit subjects we will examine, we base our decision on the significance and interest of an area or topic to our primary clients, the Members of the Legislative Assembly and the public. We consider both the significance and risk in

our evaluation. We aim to provide fair, independent assessments of the quality of government administration and to identify opportunities to improve the performance of government. Therefore, we do not focus exclusively on areas of high risk or known problems.

We select for audit either programs or functions administered by a specific ministry or government organization, or cross-government programs or functions that apply to many government entities. A large number of such programs and functions exist throughout government. We examine the larger and more significant of these on a cyclical basis.

Our view is that, in the absence of comprehensive accountability information being made available by government, performance audits using the direct reporting approach should be undertaken on a five- to six- year cycle so that Members of the Legislative Assembly and the public receive assessments of all significant government operations over a reasonable time period. We strive to achieve this schedule, but it is affected by the availability of time and resources.

Planning and Conducting Audits

A performance audit comprises four phases of a performance audit—preliminary study, planning, conducting and reporting. The core values of the Office—independence, due care and public trust—are inherent in all aspects of the audit work.

Preliminary Study

Before an audit starts, we undertake a preliminary study to identify issues and gather sufficient information to decide whether an audit is warranted.

At this time, we also determine the audit team. The audit team must be made up of individuals who have the knowledge and competence necessary to carry out the particular audit. In most cases, we use our own professionals, who have training and experience in a variety of fields. As well, we often supplement the knowledge and competence of our staff by engaging one or more consultants to be part of the audit team.

In examining a particular aspect of an organization to audit, auditors can look either at results, to assess whether value for money is actually achieved, or at management's processes, to determine whether those processes should ensure that value is received for money spent. Neither approach alone can answer all the questions of legislators and the public, particularly if problems are found during the audit. We therefore try to combine both approaches wherever we can. However, because acceptable results-oriented information and criteria are often not available, our performance audits frequently concentrate on management's processes for achieving value for money.

If a preliminary study does not lead to an audit, the results of the study may still be reported to the Legislature.

Planning

In the planning phase, the key tasks are to develop audit criteria—"standards of performance"—and an audit plan outlining how the audit team will obtain the information necessary to assess the organization's performance against the criteria. In establishing the criteria, we do not expect theoretical perfection from public sector managers; rather, we reflect what we believe to be the reasonable expectations of legislators and the public.

Conducting

The conducting phase of the audit involves gathering, analyzing and synthesizing information to assess the organization's performance against the audit criteria. We use a variety of techniques to obtain such information, including surveys, and questionnaires, interviews and document reviews.

Reporting Audits

We discuss the draft report with the organization's representatives and consider their comments before the report is formally issued to the Legislative Assembly. In writing the audit report, we ensure that recommendations are significant, practical and specific, but not so specific as to infringe on management's responsibility for managing. The final report is tabled in the Legislative Assembly and referred to the Public Accounts Committee, where it serves as a basis for the Committee's deliberations.

Reports on performance audits are published throughout the year as they are completed, and tabled in the Legislature at the earliest opportunity. We report our audit findings in two parts: a highlights section and a more detailed report. The overall conclusion constitutes the Auditor General's independent assessment of how well the organization has met performance expectations. The more detailed report provides background information and a description of what we found. When appropriate, we also make recommendations as to how the issues identified may be remedied.

It takes time to implement the recommendations that arise from performance audits. Consequently, when management first responds to an audit report, it is often only able to indicate its intention to resolve the matters raised, rather than to describe exactly what it plans to do.

Without further information, however, legislators and the public would not be aware of the nature, extent, and results of management's remedial actions. Therefore, we publish updates of management's responses to the performance audits. In addition, when it is useful to do so, we will conduct follow-up audits. The results of these are also reported to the Legislature.